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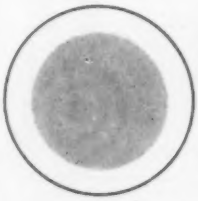

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INFANTRY JOURNAL

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Individual Instruction in Rifle Practice

By Colonel A. J. Macnab, Jr., U. S. Army

INTRODUCTION

THIS system of instruction was first developed by the Second Battalion, 14th U. S. Infantry, stationed at Fort Lawton, Washington. The officers of this battalion were convinced that there was no reason why every man should not learn to shoot, as it is a purely mechanical operation, combined with the will power to carry out this mechanical operation with a loaded rifle. They worked together along these lines for three target seasons and at the end of that time succeeded in qualifying as Marksmen or better every man in the post. This system has been rewritten three times since then, but the main points of it have remained the same. By the use of this system, Company B, of the 25th Infantry, was brought from the lowest shooting organization in the Hawaiian department to the highest, in one target season. It was used in instructing twelve hundred officers and noncommissioned officers of the 83d Division of the National Army on a two-weeks course of instruction at Camp Perry, Ohio, with the result that they made a record that has never before been equalled.

There is nothing revolutionary in this system. Practically all of the points emphasized therein have been recognized in the past by good shots as being correct. These points have been combined, systematized and reduced to simple language. An effort has been made to include all that the average soldier should know to become a good shot and no more. It does not pretend to be an exhaustive treatment of the subject of rifle shooting. A great mass of scientific data and information upon which rifle shooting is based is left out entirely as being difficult for the beginner to understand and more likely to confuse than to aid him.

METHODS OF INSTRUCTION

There are four distinct steps in the preliminary work: (1) Sighting and aiming; (2) position; (3) trigger squeeze; (4) rapid fire. Each step, as it is taken up, starts with a lecture by the instructor to the assembled command. The lecture includes demonstrations of the methods of instruction, positions, trigger squeeze, etc.

These lectures are an essential part of the training. If properly given they awaken the interest and enthusiasm of the whole command for the day's work, and they give an exact knowledge of how each day's work is to be carried on, something that many men cannot get from reading a description of it, no matter how accurate and detailed that description may be.

Hard work, and lots of it, on the

part of the officers and noncommissioned officers, is an absolute essential. This system is not automatic. Merely to supply each man with a copy of the book without any particular effort to see that all the points are understood and applied would not produce any very remarkable results. The instruction must be thorough, and it must be individual. General instruction of the command is not enough. The instructor must satisfy himself that each man understands each and every point and can explain them in his own words.

The Blank Form (see page 944), which is explained in the first lecture, must be kept by each squad leader and by each platoon leader independent of the squad leader. This blank form shows at a glance just how much each man knows about each point, and he must be worked on until he can be classed as excellent on all points. The company commander must carefully supervise the work. He should pick out men at random through the different platoons and put them through a test to see if their instruction has been thorough and is progressing satisfactorily.

The importance of exactness should be impressed on the men at all times. For example, men in adjusting the sights in the sighting drills or triangle exercises are apt to say, "That is about right." There is no such thing as a sight that is about right; it is either absolutely right or it is all wrong. Exactness in every detail is hard to get, but it must be attained.

Interest and enthusiasm must be sustained and everything possible should be done to stimulate them. If the exercises are gone through in a manner approximately correct and as a routine piece of work, the results will be very disappointing. As soon as these exercises deteriorate into a perfunctory performance of a physical exercise, they do more harm than good.

There are three essentials to good shooting: (1) Correct aiming, (2) correct positions, (3) correct trigger squeeze. In rapid fire three more essentials are added: (1) Correct loading of magazine from clip, (2) correct working of the bolt, (3) keeping the eye on the target while working the bolt.

The exact way of instructing in the essential points is shown in the form of questions and answers under the heading, "Examination of man before starting range practice." This should be consulted by the instructor at all times during the preliminary work, and each man must be put through a thorough test along the lines indicated in these questions and answers before he is allowed to fire a shot.

The two most important points are the trigger squeeze on the part of the man firing, and the watching of his right eye by the coach to see if he is squeezing the trigger properly. The description of the trigger squeeze is a little different from the usual way of stating it. We have always been told by the authorities on shooting that the trigger must be squeezed by a *steady* increase of pressure. But this does not mean much to the average beginner. Now if we analyze this *steady* or uniform increase of pressure we find that, if it is in fact a steady increase, a man cannot know exactly when enough pressure has been applied to set the rifle off. A fine instrument will show that the amount of pressure necessary to discharge the piece will vary a little with every shot. If a man knows when his rifle is going off it is because he suddenly gives it all the rest of the necessary pressure. In this case it is

not a steady increase. If the increase of pressure is steady the man cannot know when the rifle will be discharged; consequently, in order to have him squeeze the trigger properly, he is told to squeeze it in such a way as not to know just when the rifle will go off. This does not mean that the process is necessarily a slow one and that it will take a comparatively long time to fire a shot. A man *through training* can reduce the time used in pressing the trigger to as low a point as one second and still press it in such a way as not to know at just which part of the second the discharge will take place. Once a man has acquired the ability to squeeze the trigger properly, even though it be very slowly, he rapidly learns to speed up on it without changing the process.

Whenever a man is in a firing position, whether it be at preliminary exercises or with a recording rod or at gallery practice or on the range, he must have a coach beside him to watch him and point out his errors. A coach must watch the man himself. If a coach watches the target instead of watching the man firing, as a great many are apt to do, he might as well not be there at all.

The course of instruction is divided into two parts, preparatory exercises and range practice. Practically everything is included under the heading of preparatory exercises, because this is the period of training during which the man learns everything necessary to become a good shot. When he goes on the range he will be able to start in shooting well if he applies what he has learned previously. And if he has been properly instructed he will put into practice all the points laid down in the preliminary exercises, with the one exception of trigger squeeze, the most important of all, and the one thing over which he at first has no control.

Practically all of the range practice, then, can be devoted to teaching him the trigger squeeze. To squeeze the trigger properly the man must have will power and self-control, two traits that must be developed in him by careful study of his character and temperament and patient and untiring coaching during the firing of each shot.

Preparatory Exercises

All Men to Take Preparatory Course.—Every man who is to fire on the range should be put through the preparatory course from the beginning. No distinction should be made between recruits and men who have had range practice, no matter what their previous qualification has been. Some part of the preparatory instruction may have escaped them in previous years; it is certain that some of it has been forgotten, and in any case it will be a help to go over it again and refresh the mind on the subject.

It is a good practice to look over each man's target record of last year to see at what ranges he was weak and upon what points he needs particular instruction this year.

All of the noncommissioned officers of the company should be put through a course of instruction and required to pass a rigid test before the period of preliminary instruction for the company begins, when time permits.

Definitions

Each man should know the meaning of the following words; they are defined in the preface of the Small Arms Firing Manual: *Battle Sight, Butts, Cant, to Cant the Rifle, Drift, Grooves, Lands, Line of Aim, Trajectory,*

O'Clock, Prone, Ricochet, Shots, Score, Sighting Shots, Twist, Windage, Wind Gauge.

NOMENCLATURE OF THE RIFLE

The following parts will be pointed out and the functions of each explained: Barrel, bolt, butt plate, butt swivel, cut-off, ejector, extractor, firing pin, floor plate, follower, front sight, guard, guard screws, hand guard, lower band, lower band swivel, magazine, spring, main spring, rear sight, leaf, slide windage screw, receiver, safety lock, stacking swivel, stock, striker, trigger and upper hand; also bore, muzzle, breech and magazine.

INTERESTING DATA CONCERNING RIFLE

(U. S. Model 103)

The barrel is 24.006 inches in length and the rifling consists of four plain grooves 0.004 inch deep. The grooves are three times as wide as the lands. The twist is uniform, one turn in 10 inches. The muzzle is rounded to protect the rifling.

The bullet has a core of lead and tin composition incased in a jacket of cupro nickel. It weighs 150 grains, and the point is sharper and offers less resistance to the air than any previous model in the United States service.

The powder charge is of pyro-cellulose composition, very similar to the powder used in field and seacoast guns. The grains are small, cylindrical, perforated and graphited. The normal charge weighs from 47 to 50 grains, depending upon the lot of powder used.

The standard muzzle velocity is 2,700 feet per second. The instrumental velocity measured at 78 feet from the muzzle is 2,640 feet per second with an allowed mean variation of 20 feet per second on either side of the standard. The cartridge complete weighs about 392 grains. The muzzle velocity of 2,700 feet is obtained when fired on a normal day (70° F.). This velocity will vary directly with the temperature 1.5 feet per degree. For each degree above 70, 1.5 feet must be added to 2,700 feet to obtain the muzzle velocity. For each degree under 70, 1.5 feet must be subtracted. From this will be seen the importance of keeping all the cartridges at a uniform temperature while firing on the range, of not leaving them lying on the ground or exposed to the sun's rays and of not loading a cartridge into a heated chamber until ready to shoot.

The bullet will penetrate 33⅓ inches of white pine at 50 feet, 46.7 inches at 100 yards, 14.3 inches at 500 yards, 12.8 inches at 1,000 yards. At 500 feet it will penetrate 8.7 inches of moist sand, but only 4 inches of dry sand, and 14 inches of loam free from sand. On thoroughly seasoned oak it will penetrate 12.2 inches at 50 feet, 33.6 inches at 100 yards. It will penetrate a brick wall 5 inches at 100 yards.

The maximum range is 3.1 miles with the muzzle elevated 45 degrees. It takes the bullet 31.36 seconds to make the flight, and at its highest point it will be 6,844 feet high. This height is reached when the bullet is 3,432 yards from the muzzle.

The danger space for a man standing is continuous up to 600 yards.

CARE OF RIFLE

Always clean at end of the day's shooting. Never leave rifle over night without cleaning after it has been shot.

Always clean from the *breech*, and always with a ramrod. The "pull through" is for use in the field only. Use vaseline or other heavy oil. Never

use 3-in-1 oil or any other light oil. Rifle should be cleaned out first with No. 9 or other good powder solvent. Solvent is left in over night and then cleaned out and rifle oiled.

A rifle must be cleaned at least twice after being fired, once at the end of the day's shooting and once the next day. It cannot be properly cleaned in one cleaning because the fouling that has been driven into the pores of the metal does not sweat out where a cloth can reach it until about 24 hours after the first cleaning. If the rifle is not going to be shot again soon, clean it each day for three days.

Do not put any ammonia solution into the rifle unless you have special permission to do so, and then only under the supervision of a noncommissioned officer. Never take your rifle apart without special permission.

Never leave a rag in the barrel of the rifle.

Never leave your rifle lying flat on the ground.

Never shoot a rifle when it has any dust, dirt or snow in the barrel. Wipe the oil out of the barrel with a clean rag before going to the firing point. Never leave a barrel unoiled, even for inspection.

Vaseline is the best oil to use on rifles.

Do not use ammonia solution in the rifle while the barrel is hot.

The following parts of the rifle only can be removed by the soldier for the purpose of cleaning: Front sight cover (on Springfield), bolt, floor plate and follower, gun sling, oiler and thong case.

When a powder solvent is not available it takes more work to clean the rifle, but it can, of course, be done.

The use of grease on the bullets prevents a great deal of the metal fouling, and the rifles are very much easier to clean.

EXAMINATION OF RIFLES

Each man's rifle should be closely examined, before the beginning of the preparatory season, for defects. Each barrel should be tested with gauges, and it should be noted if the barrel is pitted. Loose rear and front sights should be corrected; peep sights on the Springfield should not be smaller than size six. All screws should be tight. The upper band should be loose enough to slide on and off easily when the screw is removed. The bolt should be complete and work easily, the trigger squeeze neither too easy nor too hard, and it should be without "creep."

SIGHTING DRILLS

The sighting exercises constitute the first step of the actual training of shots. In these exercises the "sighting bar" and the "rifle rest" are used as aids to instruction.

Purpose.—(*a*) To show how to align the sights properly on the mark; (*b*) to discover and demonstrate errors in sighting; (*c*) to teach uniformity in sighting.

THE SIGHTING BAR

(For description of the sighting bar see Small Arms Firing Manual.)

The sighting bar is used in instruction for two reasons: (1) The sights are larger than on the rifle and errors in aiming can be more easily seen and pointed out to the beginner; (2) the eye-piece on the sighting bar makes the man under instruction hold his eye so that he sees the sights in proper alignment. He learns from this how to properly align the sights of the rifle. The "French Aiming Device," attached to the stock of the rifle, serves the same

purpose. It is merely an eye-piece for the rifle, and is used in showing men how the sights appear when properly aligned. Without the eye-piece the instructor cannot tell whether the man is holding his eye so as to see the sights in proper alignment or not.

Sighting Rest for Rifle. — Take an empty pistol ammunition box or a similar well-made box, remove the top and cut notches in the ends to fit the rifle closely. Place the rifle in these notches with the trigger guard close to and outside one end.

The rifle rest is used to teach a man to apply the principles of aiming to the rifle, having first learned them by means of the sighting bar. The instructor first aims the rifle in a rest at a bull's-eye and then has the man under instruction look through the sights. The man is next made to align sights on a bull's-eye, and the instructor then looks through the sights to see if he has made any error.

For each sighting bar and each rifle rest a small disc is made about 3 inches in diameter, of white cardboard or of tin with white paper pasted on it with a small bull's-eye in the center. The bull's-eye has a small hole just large enough to admit the point of a pencil in its exact center. For indoor or close-range work the bull's-eye should not be larger than a 25-cent piece.

First Sighting Exercise.—(1) Using illustrations, describe the normal sight and the peep sight. Explain that the top of the front sight is seen through the center of the circle and just barely touches the bottom of the bull's-eye, but so that all of the bull's-eye can still be clearly seen. This will give you a faint impression of a white line between the bottom of the bull's-eye and top of the front sight.

2. Explain the sighting bar and tell why it is used.

3. With the sighting bar represent the normal sight and the peep sight and have each man in the squad look at them.

4. Adjust the sights with various *small* errors in alignment and have each man look at them and tell you what the error is.

5. Have each adjust the sights so that they are properly aligned.

The above exercises are first done without a bull's-eye to aim at in order to get the alignment of sights. Then they are done with a small bull's-eye on a movable disc to combine sighting with aiming. It is easier to have a small bull's-eye on a disc moved to the line of aim than it is to adjust the sighting bar on a fixed bull's-eye.

Second Sighting Exercise.—The same as the first sighting exercise except that the rifle in a rest is used, with a French aiming device as an eye-piece. If the French aiming device is not available, this exercise is dispensed with.

Third Sighting Exercise.—(1) With the rifle on the rifle rest and the sights pointing at a blank paper on a box or on the wall, take a prone position with the head in the same place as in firing the rifle and look through the sights. Then by signal or by word, have the disc with the bull's-eye on it moved until the bottom edge of the bull's-eye is in exact alignment with the sights. Then command "Hold!" and move away from the rifle and let the man undergoing instruction look through the sights to see what a proper aim looks like.

2. Start over again and let the man under instruction look through the sights and have the disc moved until they are aligned on the bottom of the

bull's-eye. The instructor then looks through the sights to see if any error has been made.

3. Have the sights adjusted on the bull's-eye with various *very* slight errors and see if the man under instruction can detect them readily.

Fourth Sighting Exercise. — Using the sighting rest for the rifle, require the man under instruction to direct the marker to move the disc until the sights are aimed at the bottom edge of the bull's-eye and command "Hold!" The instructor then looks at the aim and, after noticing whether the aim is right or wrong, commands "Mark!" The marker, without moving the disc, makes a mark on the paper with a pencil, through the hole in the center of the bull's-eye. Repeat the operation until three marks have been made. The instructor looks at the aim each time, but he does not say anything to the man until all three marks have been made and joined together so as to make a triangle. The faults, if any, are pointed out to the man. The size and shape of the triangle will be discussed and the exercise will be repeated a number of times.

The object of the exercise is to show the man the importance of uniform and correct aiming, and to instill into his mind a sense of exactness. At 30 feet, with a small bull's-eye, a man should be able to place all three marks so that they could be covered by the head of an ordinary carpet tack.

This exercise should also be held, near the end of the preliminary training, at 200 yards on an 8-inch movable bull's-eye, and, if time permits, at 500 yards on a 20-inch movable bull's-eye. Long-range triangle exercises teach the men to aim accurately at a bull's-eye off in the distance where the outlines are indistinct, and, if the exercise is properly handled, it helps greatly to sustain interest in the work. At 200 yards a man should be able to make a triangle that can be covered with a silver dollar, and at 500 yards a triangle no side of which is over 2 inches long. The men doing the marking are supplied with tissue paper to copy off each man's triangle and write his name, which is signalled from the firing point, under it. When the marking detachment is changed, these tracings of the triangles are carried back to the firing point so that the men can see what they have done.

With the Model 1917 rifle, the exercises are with the peep sight only; with the Springfield rifle the exercises are with both peep sight and open sight.

The sling is a big help to everybody in shooting. It helps to keep the rifle steady and to press the butt of the rifle against the right shoulder with the same amount of force for each shot, which is very important. The gun sling takes up much of the recoil.

Each man should have his gun sling adjusted to him by the instructor, and he should be required to leave it with that adjustment. The lower loop can be tightened enough to adjust the sling for drill or parade purposes. In shooting, the sling should be as tight as it can be made and still allow the man to get into it.

The left arm is put through the upper loop from right to left and the leather keeper pulled down to hold it above the left elbow. The left hand is moved over the top of the gun sling to grasp the rifle. This causes the sling to lie smoothly along the hand and wrist. The lower loop is not used and should be loose.

The gun sling should be used in all preparatory exercises and at all extended order drills, field exercises and maneuvers.

BREATHING

The proper breathing is very important and must be practiced at all times during the pointing and aiming and trigger squeeze drill. Draw in an ordinary breath and hold it while aiming and squeezing the trigger. Do not hold the breath with the throat open. Close the throat and let the lung full of air lean against the closed throat.

THE BELGIAN AIMING DEVICE

This should be used freely in the preparatory position and trigger squeeze exercises, practice with the recording rod and gallery practice, to instruct the men in aiming and to correct errors. It is a great help to the instructor in teaching men to shoot, both in the preliminary work and in range practice.

POSITIONS

In all the positions the man is half faced to the right.

When any man assumes a normal position for shooting, there is some spot to which the rifle will point naturally. If this spot is not the center of the target, he should shift his whole body so as to bring it there. Otherwise, he will have to pull the sights on to the center of the target for each shot by muscular action, and will be firing each shot under a strain.

Standing Position. — Half faced to the right, feet from 1 to 2 feet apart, body erect and well balanced, left elbow pretty well under the rifle, left hand gripping the piece some place along the grooves cut for that purpose on the stock, right elbow at the height of the shoulder, butt of rifle held firmly against the shoulder, right cheek against the stock.

The position with the left hand against or under the trigger guard and left elbow resting on the hip is not a practical game position and should not be used.

It is doubtful whether the gun sling is of any value in the standing position, and it may be dispensed with if desired.

Kneeling Position. — Half faced to the right, kneeling on right knee and sitting on right heel, the left arm resting on the left knee with the point of the elbow beyond the knee cap, left lower leg vertical, right elbow at height of shoulder.

Sitting Position.—About half faced to the right, feet pretty well apart, well braced on the heels, which are dug slightly into the sod. Body leaning rather well forward, with elbows resting between the knees and well braced.

The sitting position is used when firing from ground that slopes downward to the front, and in practicing it the feet should be slightly lower than the ground upon which the firer sits. The cross-legged position is of no value on the slope of a hill, and consequently should not be used in target practice.

Prone Position.—In the prone position the elbows should be well under the body so as to raise the chest off the ground. Avoid spreading the elbows apart; it is an unsteady position and leaves the chest so near the ground that the neck has to be strained backward in order to see through the sight. This strained position of the neck interferes with good vision.

The prone position is with the body lying at such an angle that the rifle will point naturally at the target when brought to the shoulder, 45 degrees.

The elbows should be well under so as to raise the chest off the ground, and the eye should be as near the cocking piece as possible without taking a strained position. The position of the thumb and finger of the right hand is to be such as not to hurt the face in firing; with the Springfield rifle the thumb will usually be along the stock, not over it. It should also be noted that with the Model 1917 rifle, the eye should not be as near the cocking piece as with the Springfield rifle.

Men should not be permitted to vary from the set rules as to position and methods of shooting, no matter what their previous experience has been. Some men who have individual peculiarities in position convince themselves that this position is the best for them, but experience shows that a conscientious effort on their part to shoot in the correct position always results in higher scores.

Sandbag Rest. — It is important to have the sandbag high enough to permit the taking of the normal prone position, which is with the elbows well under, and the chest well off the ground. The natural tendency is to have a low rest and be very flat on the ground, with the elbows spread apart. This is a faulty position and results in lower scores than if no rest at all were used. The sandbag, where properly used, is a great help. When it is not properly used it is a handicap. Arrange the sand in the bag in such a way that when you take the normal prone position the bag will support the left forearm and wrist with the left hand resting on the top of the bag, the rifle lying on the hand. Make the sandbag fit you in the normal position. Do not alter your position to fit the sandbag.

During the period of preliminary exercises instruction should be given with the sandbag rest in: (1) Trigger squeeze exercises, (2) practice with the recording rod, (3) gallery practice.

Position in Standing Trench.—This position will vary according to the style of trench and the build of the man. In general it is a good plan to have as many points of support for the body and arms as possible.

In a trench that has no berm for the left elbow, the position is the normal standing position with the left hand against the top of the parapet and the rifle, just beyond the hand, resting on the parapet.

With the berm, the position is about the same, except that the left elbow rests on the berm.

When the berm is wide enough, as it often is, both elbows can be rested on it, and the position of the upper part of the body is about the same as in the prone position with the sandbag rest.

In all positions in a trench, lean well against the butt of the rifle to insure firmness and steadiness.

POSITION EXERCISES

Instruction in positions is the second step in the preliminary training. As each step includes everything that has preceded, the exercises in positions include correct sighting and aiming, correct use of the gun sling, and correct holding of the breath. The importance of correct position cannot be too strongly emphasized. Men will be carefully watched and coached during these exercises from the very beginning, and they will be drilled so much in the correct positions that they will assume them naturally and feel at ease in them.

There is no set exercise for this instruction. The instructor explains the importance of correct position to the

squad or platoon, then shows them the correct standing position and requires each man to assume the position, the instructor correcting any errors. The same thing is done in the kneeling, sitting and prone positions, the position with the sandbag rest and the position in a standing trench.

The second phase of training in positions is individual instruction under a coach. The coach has the man assume each of the different positions and aim at a small bull's-eye placed at an appropriate height. The man adjusts the sling, assumes the position, takes up the slack on the trigger, aligns the sights accurately on the bottom edge of the bull's-eye, and holds his breath. The coach watches him on all of these points and corrects any errors. He watches the sights through the Belgian aiming device to see if the man is aiming correctly, and he watches the man's back to see if he is holding his breath properly while aiming. He also sees that the man does not cant the piece to either side.

The man is made to understand that taking up the slack on the trigger is a part of the position and aiming exercises, but he is not allowed to squeeze the trigger in these exercises, as that part of his instruction comes later.

TRIGGER SQUEEZE

The one most important thing in shooting is to squeeze the trigger in such a way as to set off the rifle without spoiling the aim. To do this the trigger must be squeezed so steadily that you will not know just when the rifle will go off. Any man can hold the rifle steady enough, for a long time, to have it make a good shot. The bad shots are all made by spoiling the aim just as that rifle goes off. This is done by *pulling* on the trigger or flinching, or both. If a man squeezes the trigger so steadily as not to know when it is going off, he doesn't spoil his aim and he can't flinch because he doesn't know when to do it.

No good shot *catches* his sight on the mark and then *sets it off* so as to hit the mark. That is what the poor shots do. The good shot holds the sight as nearly on the mark as possible and keeps squeezing on the trigger until it goes off. The good shot is not the man with the *quick eye*. He is the man with the "slow trigger." This method of squeezing the trigger must be followed out in all preliminary practice or the whole value of the practice is lost.

There are not two correct methods of squeezing the trigger. There is only one, and that is to squeeze it with such a steady increase of pressure as not to know when it is going off. The excellent shots are the ones who, through training, have learned to increase the pressure only when the sights are in absolute alignment with the bull's-eye. When the sights get slightly out of alignment they hold what they have with the finger and only go on with the increase of pressure when the sights become properly aligned again. They never "give it the rest" or "set it off."

The difference between bad shots and good shots, good shots and very good shots, and very good shots and excellent shots, is only the difference in their ability to squeeze the trigger properly. The whole heart and soul, the beginning and end, of target shooting is the trigger squeeze. Any man with any eyesight at all and strength enough to carry himself around can align the sights on the target, and hold them there for an appreciable space of time. When he has acquired the will power and self-con-

trol to forget that there is to be an explosion and a shock, and squeezes on the trigger with a steady increase of pressure until it goes off by itself, he has become a good shot, and not until then.

This applies to rapid fire as well as slow fire. The increase of pressure is faster in rapid fire, but the process is the same.

CALLING THE SHOT

Always notice exactly where the sights are pointed when the rifle goes off and call out at once where you think the bullet hit. Call your shots even when only snapping at a mark, so as to acquire the habit. It will help you to hold closer. No man can become a good shot until he can call his shot before it is marked.

TRIGGER SQUEEZE EXERCISE

The third step in the preliminary training, and the most important of all, is the instruction in trigger squeeze.

There is no set exercise for this part of the training. The instruction is individual and each individual undergoing it is very carefully coached every time he presses the trigger, until he can be classed as "excellent" upon this point.

Men are not allowed to do any trigger squeezing, such as snapping the piece at a mark simulating fire, until they have been thoroughly instructed in trigger squeeze; and then, in all drills and field exercises where fire is simulated, they should be cautioned to aim at a definite object and carry out the correct principles of aiming and squeezing in the trigger, and to "call" each shot. Careless trigger squeezing in field exercises can easily spoil a man's chances of ever becoming a good shot.

The instructor first assembles the squad or platoon, explains the importance of correct trigger squeeze, shows them what the slack is and how to take it up with the finger, and he finds out by questions if the men understand what is meant by "steady increase of pressure," *i. e.*, that the increase is only applied when the aim is correct, but that each time the increase is continued it shall be by a steady pressure and not by a jerk.

The second phase of this exercise is individual instruction under a coach. The man is first taught the trigger squeeze in the prone position with the sandbag rest, because in this position he can hold steadily and has not the temptation to "snap" in the shot at the instant the front sight touches the bull's-eye, as he has in an unsteady position such as standing or kneeling. After he has learned the principles of trigger squeeze with sandbag rest, he is practiced in the other positions, but, for the first day at least, he is not allowed to practice except in the prone position, first with and then without the sandbag rest.

The coach watches for all the points taken up in previous instruction, in addition to the squeezing of the trigger.

Details of a trigger-squeeze exercise:

1. Get *correct* position with rifle pointed at target.
2. Take up the slack.
3. Align aim accurately on bull's-eye.
4. Hold the breath.
5. Press the trigger (*only* when the aim is right and then only with a steady pressure).
6. "Call the shot."

The coach watches the man on each one of these points, and at times he checks up on the aiming with the Belgian aiming device, and on his breathing by watching his back.

A very great deal of trigger-squeeze exercise is necessary, but it must be carefully watched and coached and practiced to keep it along the right lines. Trigger-squeeze practice that is not along the right lines is worse than none, and the more a man practices the harder it will be to teach him to shoot.

POSITIONS IN RAPID FIRE

For the Regular Course.—At 200 *yards* either the sitting or kneeling position is taken upon the appearance of the target. The sitting position is much more steady than the kneeling and is assumed as easily and as rapidly. It should be used by all men.

To assume the sitting position rapidly from standing, first sit down and aim at the target to find out where your heels should be and the exact spot upon which to sit. Then mark the places. At the command "ready" stand with your heels in the marks, and, as the target appears, sit down on the spot previously marked, placing the right hand on the ground as you go down to prevent shock.

At 300 *yards* the prone position is assumed upon the appearance of the target. The prone position can be taken and an aimed shot fired more quickly than any other position. This was proved conclusively by the "Surprise Fire" events at the National Matches of 1913.

The movement is described by the numbers for the purpose of instruction and to show the sequence of movement. After this sequence is learned it should be executed as one motion. With practice, men can take the prone position and be aiming at the target in less than two seconds.

The place where the elbows are to rest having been marked, stand about 2 feet to the rear and a little to the left of these marks; the exact place to stand will depend on the size of each man and the angle at which he lies in a prone position. Being at the "ready," sling adjusted, (ONE) throw the right foot well back and stoop down as far as possible, placing the butt of the rifle on the ground 4 or 5 inches to the left of the spot where the right elbow is to rest, retaining the grip on the rifle with both hands; (Two) place the right elbow on the ground in the spot marked for it; (THREE) place the left leg beside the right and slide well back, lying on the belly; (FOUR) take the butt of the rifle off the ground and place it against the right shoulder; (FIVE) lower the left elbow to the ground in the spot previously marked for it. This will bring you in your normal position, with the rifle pointing at the target. Care should be taken to place the butt of the rifle on the ground without jar and to place the elbows on the ground in the same way. With practice this position can be assumed very rapidly and without shock.

For Special Course "C." — In this course the firer is already in the firing position and ready to shoot when the target appears. But the ability to go to any position rapidly from standing is very valuable in war, and practice in this should be held, even if it is not to be used in the prescribed target course.

RAPID-FIRE PRACTICE

Rapid-fire practice is the fourth step in the preliminary training.

It must be impressed on the man undergoing instruction that rapid fire does not mean that accuracy is in any way sacrificed to rapidity. A man never shoots any shots except accurate ones. By training he learns to make this ac-

curate shooting more and more rapid, until he is able to get in ten to fifteen accurate shots a minute, but this is the limit; he should never attempt to fire more than fifteen shots per minute, and not more than ten until he has had long training on the rifle range and is a seasoned shot. All the points learned in slow fire are carried out in rapid fire, and it is especially important that he understand that the trigger squeeze is the same as in slow fire. Time is gained by reloading the magazine quickly and without fumbling, by working the bolt rapidly, and by keeping the eye on the target while working the bolt.

The man must be constantly watched to keep him from acquiring the habit of looking into the chamber while working the bolt. The man who "chamber gazes" always works the bolt slowly so as to see the cartridge run in, and he also loses time in finding his own target again. He often fires on the wrong target. The application in war is apparent. If he takes his eye off an indistinct target to gaze into the chamber while working the bolt, he might not be able to find his target again.

In the rapid-fire exercise the coach watches for all the points, but pays particular attention to the following:

1. Position.
2. Working the bolt rapidly.
3. Keeping the eye on the target while working bolt.
4. Taking up the slack.
5. Trigger squeeze.
6. Reloading magazine from clip without fumbling.

As these things follow each other he can watch all of them without difficulty.

Rapid-fire practice is held in all the positions, and a great amount of it is necessary. But it must be carefully coached practice until the man has demonstrated that he is thoroughly conversant with the principles.

In the prone position, raise the right elbow off the ground in working the bolt, but keep the butt against the shoulder. With the Springfield rifle the bolt may be worked without raising the right elbow, but on the Model 1917 the stock is too long to do this with any rapidity.

Don't try to hold the breath for all ten shots; take a short breath after each shot.

Dummy cartridges should be used. When enough are not available, loading can be simulated, but with the Model 1917 rifle the floor plate and follower must be removed to permit the working of the bolt.

Aiming bull's-eye or miniature, figures placed at the proper height should always be used. If possible, rapid-fire exercises should also be held on full-sized targets, placed at the distances at which the rapid fire on the range will take place. This would be 200, 300 and 500 yards if the regular course is to be fired, and 100, 200 and 300 yards if Special Course "C" is to be used.

Each exercise begins with the command "Commence Firing" and ends with the command "Cease Firing," except when some arrangement has been made so that the target appears for the allotted time and then disappears. The coach, or someone assisting him, should call off the seconds at first, *i. e.*, "Five," "Ten," "Fifteen," etc., so as to get the element of time fixed in the man's mind.

Be sure and get into the right position before starting to shoot, and always fire the first shot very carefully.

CHANGING THE SIGHT

With Springfield Rifle.—Demon-

strate to each man that moving the rear sight in any direction has the effect of making the barrel point more in that direction. Have full-sized 200, 300, 500 and 600-yard slow-fire targets marked off with elevation and windage lines to correspond to the lines in the score book targets, and paste them up in or near barracks at the beginning of the preliminary period.

1. Explain these targets to the man and show him why the lines are at different distances apart for each range.

2. Indicate the position of a shot on the target and have him correct his sight to bring the shot to the center of the bull's-eye.

3. Repeat this exercise with the man standing far enough away from the target so that he cannot see the lines, requiring him to plot the shot in the score book and to get his sight changes from that. Then let him come up to the target to see for himself whether he has plotted his shots accurately.

4. Consider that the sights of his rifle are not normal, set his sights away from zero both as to windage and elevation and repeat the exercises.

5. Have the same exercises on rapid-fire targets to teach him how to change his windage and holding place. These drills should be frequent and the test of each man should be thorough.

Wind Gauge.—One point of windage will move a shot 4 inches for each 100 yards the rifle is distant from the target. The bullet will move the same way as the rear sight. If you want to make the bullet hit more to the left, move the rear sight to the left. If you want it to hit more to the right, move the sight to the right.

With Model 1917 Rifle.—This rifle has no wind gauge, so the above instructions have no bearing in so far as they refer to windage.

This instruction with the Model 1917 rifle is similar, however, but instead of showing how much to move the wind gauge, the man will be shown how far to "hold off" to correct the error. He is also shown how far off the line of aim the wind will blow the bullet at 200, 300, 500, 600 and 1,000 yards, when blowing at right angles to the line of fire and when blowing at an angle of 45 degrees to the line of fire, at 5, 10 and 20 miles per hour, respectively. This will be shown by means of a chart drawn on the full-sized target for each range.

EFFECTS OF WEATHER CONDITIONS

The weather conditions, except wind, have very little effect on the bullet back to 600 yards. But beyond 600 yards it is very important to know what effect is produced by the different conditions and to be able to allow for them.

Wind.—The wind blows the bullet out of its path. The distance it will be blown from its path depends on the force and direction of the wind. (See charts in score book.)

Temperature of the Air.—Warm air is not as dense as cold air; it does not stop a bullet as much as cold air. So a bullet will go straighter on a warm day. This makes it hit higher than it does on a colder day. Moist air does not stop a bullet as much as dry air. A bullet will go straighter on a wet than on a dry day and will hit the target higher.

Light.—Light has no effect on the bullet, but it does affect the aiming. With the peep sight, a bright light makes the bull's-eye look so distinct that a man can hold very close and still see it all very easily. On a dull day the

bull's-eye is not so distinct, and the front sight has to be held a little lower down in order to see all the bull's-eye plainly. This will make the bullet go lower down. A man usually shoots lower on a dull day than he does on a bright day when he uses the peep sight.

With the open sight a man usually shoots higher on a dull day because he can't see his rear sight notch so clearly and he sticks the front sight higher up than he thinks.

The errors due to the change of light are greater with the open sight than with the peep sight. Very often sunlight coming from the right will make you shoot a little to the left because you see the right side of the front sight more clearly and hold that part of it under the bull's-eye. Sunlight from the left makes you shoot to the right.

Mirage.—The heat waves seen near the ground on a target range are called "Mirage." These waves indicate which way the wind is blowing and must be watched carefully. Sometimes there is no wind at all on the firing point, but quite a breeze further down the range. The heat waves will indicate which way it is blowing and how fast. The mirage waves lead the way the wind is blowing.

RECORDING ROD

Practice with the recording rod is a great help and costs practically nothing. With it men can be taught the correct position and how to aim and squeeze the trigger. It should be used freely and in conjunction with the Belgian sighting device, so that the instructor can correct at the very first any errors in sighting or trigger squeezing.

Practice should be had with it in rapid as well as slow fire, and with the sandbag rest. Men should be required to call their shots.

GALLERY PRACTICE

The cost of ammunition for gallery practice is very small and, if properly conducted, a great deal can be learned through it. Each man should be watched and coached as carefully in gallery practice as in range practice. The aiming device should be freely used so as to correct errors at the very beginning. Marksmen and Sharpshooters whose preliminary range practice is limited by regulations should be given a great deal of gallery practice.

Practice should be had in slow and rapid fire and with the sandbag rest.

Men should be required to call their shots.

The "X" target and the iron target supplied by the Ordnance Department are too large and tend to give a man a false idea of his shooting ability. The "Y" target will do very well for all ranges.

It is best to use paper targets, ten shots to each target, and to keep a file of each man's targets, with his name, date, range and position written on each. In this way each man will see when his target is brought to the firing point just what he has done, and the instructor can point out his errors to him. The instructor can tell by looking through a man's file of targets what progress he has made and in what kinds of fire he needs the most instruction. A plate for printing "Y" targets can be purchased at a small cost, and the post printer can print several thousand of them for very little. Small rapid-fire targets should be obtained in the same way. A small target range, with pit and revolving targets, helps to add

interest to gallery practice, and it facilitates the work. The target frames can be on each end of a light piece of board which revolves on a pivot in the middle, at right angles to the line of fire.

It is best to begin gallery practice in the prone position with sandbag rest. This will help to keep the man from getting into bad trigger-squeeze habits at the very start.

Gallery rifles should be cleaned every ten rounds. The cartridge holders should be cleaned frequently with a solution of sal soda, and during the gallery season they should be kept in kerosene when not in use.

Gallery practice is of no value if the rifles are not accurate. If the mouth of the cartridge holder is dented, the shot will go wild. This must be constantly watched and dented cartridge holders repaired or discarded. To avoid injuring the holders, always use the rifle as a single loader and push the holder into the chamber with the hand, not with the bolt. In rapid-fire practice have someone sit beside the man firing and load in a holder each time the bolt is pulled back. To compensate for the loss of time in doing this, allow about 5 seconds more on the time.

Competitions between individuals, squads, platoons and companies should be held.

SCORE BOOK

Each man should be required to keep an accurate record of each shot fired on the range, and a score book for that purpose should be issued to him at the beginning of the preparatory season. The wind chart should be explained to him and he should be shown the correct elevation and windage to bring his shots to the center of the target. He should be given windage and elevation correction drills as laid down above.

ESTIMATING DISTANCE DRILLS

(See Small Arms Firing Manual, Chap. v.)

QUALIFICATION COURSE

Each man should know before going on the range how many shots he has to fire in the qualification course in slow and rapid fire at each range, how much he will have to make to qualify, and what he will have to average at each range.

HABITS

Alcohol and tobacco affect both the eyes and the nerves in direct proportion to the amount used. A smoker will find that he has much clearer vision on quitting tobacco. It is best to stop entirely the use of both alcohol and tobacco at least a month before going on the range. But it will be a help to quit at any time during the target season.

FINAL WORD ON PRELIMINARY TRAINING

This training is primarily to teach each man the exact way of doing each of the things that are necessary for good shooting. But merely knowing them is not enough. Any man of ordinary intelligence can learn all of them in an hour or two. But would he think of them all when shooting a loaded rifle or when in battle? He would not. Consequently he must be drilled in these things so much that he will do them without thinking—automatically. This takes a great amount of practice. The necessity for having this practice along absolutely correct lines is apparent.

All practice should be coached. But this does not mean that six or seven men will be standing around doing

nothing while waiting their turn with the coach. Organize the work so as to keep every man busy during the whole drill period. No two men need be idle. They can take turns at coaching each other on some exercise that they have already had. Keep them *busy* and *interested*.

EXAMINATION OF MEN BEFORE STARTING RANGE PRACTICE

(NOTE: The answers given herein are merely examples. Men should be required to explain them in their own words.)

Q. What is this (drawing a circle on the ground or on paper)?

A. A circle.

Q. Where is the center of it? A. Here (pointing to center).

Q. Suppose that circle to represent a peep sight which you are looking through, and you are told to bring the top of the front sight to the center of it, where would the top of the front sight be? A. Here (pointing to center).

Q. Make a mark in the circle to represent the front sight.

Q. Make a small circle to represent the bull's-eye.

Q. Is it in the center of the peep sight? A. No; the bottom edge of it is in the center.

Q. Why? A. Because the top of the front sight is in the center and it just touches the bottom edge of the bull's-eye.

Q. Should the front sight be held up into the bottom of the bull's-eye? A. No; it just touches the bottom edge of the bull's-eye so that all of the bull's-eye can be clearly seen.

Q. What is this (indicating sighting bar)? A. Sighting bar.

Q. What is it for? A. To teach men how to sight.

Q. Why is it better than a rifle for the purpose? A. Because the sights on it are much larger and slight errors can be more easily seen and pointed out.

Q. What does this represent? A. The front sight.

Q. And this? A. The rear sight.

Q. What is this? A. The eye-piece.

Q. What is it for? A. To make a man hold his head in the right place, so that he sees the sights properly aligned.

Q. Is there an eye-piece on a rifle? A. No; a man learns by the sighting bar how the sights look when properly aligned, and he must hold his head so as to see the sights the same way when aiming a rifle.

Q. Tell me what is wrong with these sights? (The instructor now adjusts the sights of the bar with various slight errors, first with sights pointing at a blank wall or paper to show the correct and incorrect adjustments of the sights, and then with the sights properly adjusted, he sights on a small bull's-eye to demonstrate correct and incorrect aiming, requiring the man to point out any errors. This is done with both the open and peep sights.)

Q. What is the difference between the way you aim with peep sight and the way you aim with the open sight? A. There is no difference. In both, the top of the front sight is brought to the center of the circle. With the open sight the top half of the circle is not there, just as if it had been cut off and carried away.

Q. Now take this sighting bar and point it at that blank paper and adjust the sights properly. (Verified by the instructor.)

Q. Now that the sights are all right,

have the small bull's-eye moved until the sights are properly aimed at it. (It is easier to move the small bull's-eye on a disk to the proper place than to try to adjust the sights on a fixed bull's-eye.)

Q. How do you squeeze the trigger? A. I squeeze it with such a steady increase of pressure as not to know just when the rifle will go off.

Q. What do you know while you are squeezing the trigger? A. I know that my sights are lined upon the bull's-eye.

Q. If the sights get slightly out of alignment, what do you do? A. I hold the pressure I have on the trigger and only go on with the increase of pressure when the sights become lined up with the bull's-eye again.

Q. If you do this, can your shot be a bad one? A. No.

Q. Why? A. Because I can't flinch, for I don't know when to flinch and the sights will always be lined up with the bull's-eye when the rifle goes off, because I never increase the pressure on the trigger, except when they are properly lined up.

Q. Is it necessary to take a long time to press the trigger in this way? A. No; I press it in the same way in rapid fire. The increase of pressure is faster, but it is so steady that I do not know just when the rifle is going off.

Q. What is this? A. A sighting device.

Q. What is it used for? A. To show the instructor how a man is aiming.

Q. Now I will take this rifle, and with the aid of the sandbag rest to hold the rifle steady, I will aim at the bull's-eye and you will watch the sights through the aiming device and tell me when my aim is right and when it is wrong, and what the error is when wrong. (The instructor now aims so as to illustrate the common faults and the man must observe and call attention to them.)

Q. I will now snap at a bull's-eye a few times, and you will watch through the sighting device and call where the shots would have hit.

Q. Now take this rifle and, using the sandbag rest, aim at the bull's-eye, and I will watch you through the device. (Instructor satisfies himself that the man understands sighting and aiming and requires him to snap a few times and to call his shots.)

Q. I will take the rifle and assume the kneeling, sitting and prone positions, and position with sandbag rest, and you will tell me whether the position is correct or incorrect in each case. (Gun sling is adjusted in all these tests.)

Q. Take this rifle and show me your kneeling, sitting and prone positions, and position with sandbag rest.

Q. Now show me how you take the sitting and prone positions rapidly from a standing position.

Q. In rapid fire how do you gain time so as not to have to hurry aiming and squeezing the trigger? A. I gain time by taking the position rapidly, working the bolt rapidly, and by keeping my eye on the target while working the bolt.

Q. How does keeping your eye on the target help you to gain time? A. A man who looks into the chamber while working the bolt always works it slowly so as to see the cartridges run in, and he loses time in finding his own target again.

Q. What other fault, in rapid fire,

comes from looking into the chamber while working the bolt? A. Firing on the wrong target.

Q. Show me how you work the bolt in rapid fire, prone, sitting and kneeling.

Q. Now show me how you load a clip of service ammunition into the magazine.

Q. Is it important to get into the correct position before beginning to shoot in rapid fire? A. Yes; even though it takes more time, I should always get into the correct position before beginning to shoot.

Q. How do you breathe while aiming? A. After I get my sights lined up on the bull's-eye I draw in an ordinary breath and hold it while aiming and squeezing the trigger.

Q. Take the prone position and aim and snap at that mark. (Instructor must assure himself that the man knows how to properly hold his breath while aiming. Many men have great difficulty learning to do this in the right way.)

Q. What is meant by "calling the shot"? A. To say where you think the bullet hit as soon as you shoot and before the shot is marked.

Q. How can you do this? A. By noticing exactly where the sights point when the rifle goes off.

Q. If a man can't call his shot properly, what does it usually indicate? A. That he did not squeeze the trigger properly and did not know where the sights pointed at the time the rifle went off.

Q. What is this? A. A score book.

Q. What are these lines for? A. To show the amount of change in elevation necessary to bring a shot to the middle of the line.

Q. What are these lines for? A. To show the amount of change in windage necessary to bring the shot to the middle line.

Q. If a shot hits here (indicating) what change in your sights would you make to bring the next shot to the center of the bull's-eye?

Q. What effect does moving your rear sight have on the shot? A. It moves it in the same direction as the rear sight moves.

Q. If you want to make the shot hit higher, what do you do? A. I raise my rear sight.

Q. If you want to make your shots hit more to the right, what do you do? A. I move my rear sight to the right.

Q. If you move your rear sight one point of windage, how much will it move your hitting place? A. Four inches for each 100 yards of range.

Q. Explain what you mean by that.

Q. I will place this spotter on this target (full-sized 500-yard target) to represent a shot properly fired by you at 500 yards with zero windage and sights set at 500 yards. Take your rifle and move your sights to bring the next shot to the center of the bull's-eye. (Instructor now tests in various ways the man's ability to make proper sight corrections.)

Q. What are the three principal uses of the score book? A. To show me where my shot group is going, to indicate how much change in the sights is necessary to move a shot or group of shots to the center of the target, and to make a record of the sight settings of my rifle for the different ranges under various weather conditions, so that I will know where to set my sight when starting in to shoot at each range, and under different weather conditions.

Q. Tell me what effect different

light and weather conditions have on a man's shooting.

Range Practice

If a man has been properly instructed and drilled in the preparatory exercises, practically all of the period of range practice can be devoted to teaching him to squeeze the trigger properly. He must be carefully watched, however, during each shot to see that he does not develop bad habits as to position, breathing, aiming or trigger squeezing.

Pads.—Men are required to wear pads on the shoulder for the first three or four days at least. A pad can easily be improvised by putting a pair of woolen gloves under the blouse so as to protect the shoulder.

Grease on Bullets.—The use of grease on bullets saves the rifle, prevents metal fouling, and makes the rifle very easy to clean. The whole bullet, down to the brass, should be greased, but grease should not be on the shell itself. A good grade of automobile cup grease will serve the purpose. The best way to grease the bullet is to stick it into the grease until the edge of the shell is level with the surface of the grease, turn the shell around in the fingers and lift it out as you turn.

If grease is used at all, it should be used throughout the whole practice. Care must be taken not to get any dirt on the greased bullets, as this will injure the rifle.

Coaching

Each man on the firing line must have a coach beside him to watch him and to help him correct errors.

As each man comes to the firing line, the coach watches him get into position and sees that the position is correct, with the body at the right angle and elbows properly placed.

He next gets down beside the man and sees if his sights are properly set. He sees if the ammunition is properly greased (if used) and free from dirt. He then watches the man load the magazine from a clip to see if he does it properly. He then watches the man's finger to see that he takes up the "slack" as soon as the rifle points at the target.

When the slack is taken up, the coach shifts his gaze to the man's eye to see if he flinches. As soon as the shot is fired, the coach says, "Call your shot."

Watching the Eye.—Errors in trigger squeeze, which are the most serious and the hardest to correct, can be detected by watching the man's eye. If his eye can be seen to close as the rifle goes off, it is because he knew when it was going off and consequently was not squeezing the trigger properly. The explosion and the shock will cause a man to wink, but this cannot be seen, due to the sudden movement of the head that takes place at the same time. If he can be seen to wink, it is because he winked first and "set it off" afterwards.

If the man is not shooting well, the fault should be found at once and corrected.

If he is flinching, there are three or four ways of helping him to stop it. Load in dummy cartridges so that he does not know they are dummy, or lock the piece without his seeing it, or make him turn his head away while the bolt is shoved home, so that he doesn't know whether it is loaded or not. Then when he shuts his eye and flinches and the rifle doesn't go off, it brings home to him what his fault is, namely, that he is flinching before he shoots, not after.

Another good way to show him the importance of squeezing the trigger so as not to know when the rifle will go off is to have him aim and let the coach press the trigger when he sees, by watching the man's back, that he is aiming. Another way is to have the coach watch the man's aim through the aiming devices and press the trigger when he sees that the aim is correct.

If the man is not shooting well, but appears not to be flinching, the coach will watch his back to see if he is holding his breath properly, and he will watch through the Belgian aiming device to see if the fault is in his manner of aiming. It is sometimes necessary in bad cases to have four coaches watch a man fire a shot. One observes his aiming through the aiming device, one watches his eye to see if he flinches, one watches his back to see if he is breathing or holding his breath while aiming, and the fourth stands behind him to correct him if he cants the rifle.

Great patience should be exercised by the instructor so as not to excite or confuse the man, and everything should be done to encourage him. It is often a good plan to change instructors. It is necessary to do so when the instructor shows signs of reaching the limit of his patience.

One thing should be borne in mind: There is no such thing as a hopeless case. No matter how many target seasons a man has been through without learning to shoot, no matter how many bad shooting habits he has, no matter how hopeless he seems at first, he can be taught to shoot.

It is often advisable to send a man back to gallery practice and preliminary drills after he has been firing for a while on the range. It will help to steady him down.

When a man is flinching and does not realize it, dummy cartridges, used in such a way that he does not know whether the rifle is loaded or not, are useful in bringing it home to him. But once he realizes he is flinching, the cure rests in careful coaching rather than the indiscriminate use of dummy cartridges.

THE SILENCER

The silencer is used with recruits, and sometimes bad flinches can be cured by its use, as it reduces the shock as well as the noise.

CHANGING THE SIGHT

With Springfield Rifle.—Always hold the same way on the bull's-eye. Never try to make a bullet hit close to the bull's-eye by changing the aiming point. When you want to change the hitting place of the bullet do so by changing your rear sight. But always aim at the bottom edge of the bull's-eye for all shots. In rapid fire with the battle sight you may have to hold higher or lower because you cannot change the sight. But in all slow-fire shooting, aim always at the bottom edge of the bull's-eye.

With the Model 1917 Rifle.—Changes in *elevation* with the Model 1917 rifle are made as stated above, but as this rifle has no wind gauge, lateral deviations, shots hitting to either side must be corrected by "holding off," so as to make these shots hit in the bull's-eye.

RAPID FIRE

Use of Dummy Cartridges in Rapid Fire.—The most valuable practice in rapid fire is to mix dummies and loaded cartridges equally in two clips, in such

a way that the man will not know which are loaded and which are dummy. He then fires a score with these two clips and the coach can see whether the man is flinching or not. When the man fires a dummy that he thinks is loaded and flinches on it, the fact of his flinching is brought home to him and this helps to steady him down to correct trigger squeeze. As the dummies can be used over and over, the practice saves ammunition and is of more value than if fully loaded clips were used.

To make dummies for this practice, bore a small hole in the cartridge near the head, dump out the powder and snap the cap. A hand-operated drill, ⅛ inch in size, and a wooden vise are all the tools that are necessary. Five or six of these dummies for each firing point should do for a whole season.

Coaching in Rapid Fire.—The coach watches the man for the following points: That he gets the correct position, that he takes up the slack promptly, that he does not flinch (by watching his eye), that he keeps his eye on the target while working the bolt, that he works the bolt rapidly, that he reloads the magazine from a clip quickly and properly.

Spotters in Rapid Fire.—Use spotters in rapid fire. When a man's target comes up to be marked, with a spotter in each shot hole, he immediately gets a picture of what he has done. It is very important that this be carried out. The Ordnance Department does not supply enough spotters for this purpose, but any company commander can easily have two or three hundred of them made out of ordinary cardboard and ordinary baling wire. They should be painted red or black on one side and white on the other.

FINAL INSTRUCTIONS

For Slow Fire at Each Range. — The following should be read to the men just before going to the firing point for record practice:

Clean oil out of rifle.

See that the screws in your rifle are tight.

Blacken sights.

Know what target you are going to shoot on and look at that number before each shot.

Take your score book to the firing point and get your elevations from it for the first shot.

Fire your first shot very carefully and then, if necessary, change the sights to bring the second shot into the bull's-eye.

Plot all your shots in the score book. Watch the score book to see where your group is going. Try to bring the center of the group into the center of the bull's-eye. Don't change your sights without thinking it over. If you have made two or three good shots and then make a bad one, don't change your sights on account of the bad one, because it is almost certain that you pulled it wrong.

Don't change your windage until you have looked at your score book to find out how much of change you need; then look at your wind gauge to see how much you have before you start to make a change.

The first thing to do when you get a bad shot is to look at your sight to see if it has jumped sideways or has been jarred down.

Be sure you get a good, comfortable position before you begin to shoot, and don't shift around during the score, especially if you are doing good shooting.

When the sandbag is used, be sure to get it *absolutely* right before you start to shoot. Then don't lose the position by moving around between shots unless it is necessary to get a more comfortable position.

Finally, fire each shot as if your whole qualification depended on that one shot, because when you get through you may find that it did.

Hold hard and squeeze carefully. That is all there is to good shooting: *To hold hard and squeeze carefully.*

For Rapid Fire.—As soon as you get on the firing line, pick out the place from which you are going to shoot and practice getting down into it two or three times, so as to be sure it is all right and so as to know just where to stand when the command "ready" is given.

Pick out your own target by number before starting to shoot, and then keep your eye on it for all five shots.

Don't look into the chamber while loading each cartridge. Do the same with the second five shots.

Gain time in working the bolt so as to have plenty of time to aim.

Fire your first shot carefully and make it a good one.

Finally, hold hard and squeeze carefully. The whole secret of rapid-fire shooting is to *hold hard and squeeze carefully.*

Appendix

Schedule of instruction for week of intensive training in preliminary rifle practice

(See Notes at end.)

Monday

Lecture to assembled regiment, 7.00-8.00 a. m.

First, second and third sighting exercises, I. I. R. P., 8.00-11.30 a. m.

Fourth sighting exercise, I. I. R. P., and continuation of morning work, 1.00-4.00 p. m.

Tuesday

Lecture to assembled regiment, 7.00-8.00 a. m.

Position and aiming exercise in prone position, with and without sandbag rest, using Belgian aiming device. This exercise includes instruction in the use of gun sling and sandbag, angle of body, position of elbows and correct method of holding breath, 8.00-11.30 a. m.

Continuation of morning work and exercises held on Monday, and, in addition, instruction in standing, kneeling, sitting position and position in a standing trench, 1.00-4.00 p. m.

Wednesday

Lecture to assembled regiment, 7.00-8.00 a. m.

Trigger-squeeze exercises in prone position, with sandbag rest. This exercise includes everything that has preceded, combined with trigger squeeze. There are six things to do in trigger-squeeze exercises: (1) Get correct position, (2) take up slack, (3) align aim accurately on bull's-eye, (4) hold the breath, (5) squeeze trigger steadily until rifle goes off, (6) "call the shot," 8.00-11.30 a. m.

Continuation of morning exercise, 1.00-4.00 p. m.

Thursday

Lecture to assembled regiment, 7.00-8.00 a. m.

Rapid-fire exercise with dummy cartridges, and when enough dummies are not available, with magazine, floor plate and follower removed. This exercise includes everything in the trigger-squeeze exercise, combined with rapid and accurate loading of magazine from clip and rapid working of the bolt while keeping eye on target. *Don't* let man "chamber gaze," 8.00-11.30 a. m.

Continuation of morning exercise and training in taking prone position rapidly, 1.00-4.00 p. m.

Friday

Continuation of Thursday's work. Final examination of each man by an officer. See I. I. R. P. Instruction of all backward men, 7.00-1.30 a. m.

Same as in morning, and long-range triangle work if weather permits, 1.00-4.00 p. m.

Saturday

Continuation of Friday work, 7.00-11.30 a. m.

Notes

1. Officers and noncommissioned officers must acquaint themselves at once with the contents of "Individual Instruction in Rifle Practice," and apply the methods prescribed therein. The study of this book by the men will be continuous throughout the week and each man will be tested as to his knowledge of it.

2. No man will go through any of the exercises prescribed for this week's work without being coached. No two men, however, need be idle; one can act as coach for the other. If he doesn't know anything, acting as coach will help him to learn.

3. When work is indoors all day, the last hour, from 3.00 to 4.00 p. m., will be given up to a practice march under arms.

4. Talks to officers in the evening on points noticed during the day, when notified.

5. Lecture to officers and noncommissioned officers on range practice the day before going on the range.

6. If range firing is delayed after completing this schedule and there is opportunity for further preliminary work, a good part of this additional preliminary work should be long-range triangle exercises and rapid-fire practice at the regulation targets placed at the prescribed distances for rapid fire.

7. When recording rods or gallery rifles are available, the additional time, if any, will be spent in this kind of practice.

FORM USED TO SHOW THE STATE OF INSTRUCTION OF EACH MAN

Names	Definitions	Nomenclature	Care of rifle	Sighting bar	Sighting with rifle	Trigger squeeze	Use of gun sling	Position	Calling shots	Breathing	Taking R. F. position	Loading for rapid fire	Sight changes	Effect of light and weather	Recording rod	Gallery	Use of score books	Estimating distance	Pads

Method of Marking — *Fair Good** — ***Very Good Excellent**** — *****Perfect

The Battle of 1918

By General Marie Eugene Debeney, Commanding First French Army

[*The following is a translation of a Note by General Debeney in connection with some lectures to be given to the First French Army. It is thought that it may be of value for lectures to the U. S. Army, and is accordingly published for that purpose.*]

IT IS most important that the events which took place in 1918 should be realized.

As a matter of fact, many people do not understand the sequence of events and are surprised that the war should have ended so suddenly. True to historical traditions, they were always expecting the decisive battle which, named after a town or village, would immortalize the German defeat. They wanted an Austerlitz or Jena, a Solferino or Sedan. They do not realize that these battles, which bear such great names, were fought on a 6, 7, or at the very most, 20-km. front. Only 100,000 200,000 or 300,000 men were engaged in the most important of these battles, which lasted one or two days at the longest.

Now our battle extended from the sea to the Moselle, on a 400-km. front, and 6,000,000 men were employed in it. Little wonder, therefore, that it lasted seven and a half months.

This, however, did not prevent it from being one single battle. The French, British, American and Belgian armies fought incessantly, under a common leader. They formed one huge army, which fought and won this unique and gigantic battle, thereby obtaining the most brilliant victory in the annals of history.

The battle of 1918 began on the 21st of March and may be divided into three phases.

Until the middle of July—that is to say, during four months—the Germans took the offensive and obtained undeniable successes, which were, however, always checked and localized after a short time.

On the 18th of July the situation was reversed. The great Allied offensive began on the left bank of the Oise, carried out by two French armies. The battle on the right bank was conducted by two other French armies and two British armies. In less than two months the Germans were everywhere compelled to retire to the famous Hindenburg line, from which they had started four months before.

At this moment the German attack may be said to have failed, their men having been driven back to their former positions at the point of the bayonets. The worst that even pessimists could say was that the battle was a draw.

But it was only the second phase; the third was about to begin.

It is well known that for three years the Hindenburg line, which the Germans called "Siegfried," had been the real line of demarcation between the latter and the Allies. The Germans regarded it as impregnable, and behind this bulwark, organized and reinforced daily, they had accumulated ammunition, constructed defenses, and brought up a formidable amount of material. In

fact, they had stripped Germany of all its war equipment in order to pile it up in France and Belgium in the sure protection of the Hindenburg line.

On the 26th of September, the Allies attacked the Hindenburg line at different points: The American Army and a French army in Champagne, a French army and three British armies in the Saint Quentin-Cambrai zone.

After eight days of terrible fighting the Allies succeeded in breaking through the famous lines, shattering them at every point.

The German *morale* suddenly collapsed, and on the 4th of October, Ludendorff, the Commander-in-Chief, asked his government to beg for an armistice.

It was too late, as the Allies were progressing fast. Along the whole front, from the Escaut to the Meuse, their armies were engaged in widening the gaps, creating fresh ones and precipitating the German retreat. In Belgium, a French army, a British army, and the Belgian army were occupying positions in the line, thus extending the battlefield as far as the sea, at a moment when the Germans were already lacking in reserves to defend the vital sectors which were most threatened.

Everything gave way before this formidable advance; successive lines fell back within a few days; artillery fire gradually diminished, and on the 6th of November the pursuit became general, whole trains being captured in the Meuse valley, at Hirson, in Belgium, everywhere.

It was a real victory, a complete victory, one beyond all expectations. Since the commencement of the offensive the Allies had taken about 400,000 prisoners and over 6,000 guns.

But there is something better still; something better than victory. There is capitulation. That, too, was to come.

On the 7th of November the German plenipotentiaries succeeded, after many difficulties, in crossing the French line extended in pursuit of the enemy; on the 8th they presented themselves before their conqueror, Marshal Foch, and on the 11th of November they hastily signed the acknowledgment of the greatest defeat known to history.

Strictly speaking, the armistice of the 11th of November, 1918, is not an armistice. It has not only been a question of a suspension of hostilities; the German army has been compelled to lay down its arms without any possibility of fighting again. Such is the capitulation of the 11th of November.

The Germans had surrendered their guns, their aircraft, their prisoners of war, their means of transport. They have surrendered their fortresses — Metz, Strasbourg, Cologne, Coblentz, Mayence; they have surrendered their fleet, and, finally, their territory — the entire left bank of the Rhine. Moreover, by abandoning three bridgeheads which guarantee the passage of the Rhine, they have opened the road to their military arsenal—Essen—and to their capital.

What is the capitulation of Sedan, where the defeated army numbered only 80,000 men, and after which fighting was again resumed for six months, compared to this débâcle?

The capitulation of the 11th of November is the most terrible disaster that an army has ever suffered.

Such was the battle of 1918, such the victory won by the allied flags.

Officers should explain to their men the absolutely modern character of the unique battle which they have won. They should look beyond their own special sphere, and prove the magnificent results of the efforts made by each regiment in its particular zone.

Our men know that they have performed their duty well.

They have seen the enemy withdraw before them; they know that they have freed their native country and redeemed their captive brethren in Alsace-Loraine.

They must try and thoroughly realize the truth. They have won the greatest battle of history; theirs is the victory.

(Signed) DEBENEY,
General.

On Universal Training

John Adams, second President, followed Washington's example and urged that Congress strengthen the country's defenses. In a special message, session of May 16, 1797, Adams said: "As our country is vulnerable in other interests besides those of its commerce, you will seriously deliberate whether the means of general defense ought not to be increased by an addition to the regular artillery and cavalry and by arrangements for forming a provisional army. With the same view, and as a measure which even in a time of universal peace ought not to be neglected, I recommend to your consideration a revision of the laws for organizing, arming and disciplining the militia, to render that natural and safe defense of the country efficacious."

President Adams here was referring to the whole militia of the Union—all able-bodied men between the ages of eighteen and forty-five. He wanted them to be organized, drilled and disciplined, and to that end called on Congress to pass additional legislation.

The Top-Sergeant

By Major Thomas Swann, Reserve Corps[1]

HOW many young officers or men have a true conception of what a real top-sergeant should be, what characteristics he should possess, both of mind and body—that indefinable something which enables him to get results so that the company commander can say, "In my absence, my company runs itself?"

When the United States entered upon the creation of its army in the period of 1917-19, the young officers were often told, "Get a good top-sergeant and your work is easy," but in our sudden expansion most officers and noncoms had to be made.

Fortunate indeed was the company commander who was lucky enough to find in his cadre, composed of a few "regulars," one man who at the outset had enough basic qualities to enable the company commander to develop him into a real top-sergeant in the short time allowed.

It is no reflection on the qualities or abilities of the junior officers in a company to state that the two biggest and most important men in any company are the captain and the top-sergeant, but there need never be any formal statement of this fact. It is something that is understood by all. There need never be any conflict of authority, provided there is a proper division of work and responsibility between the junior officers and the top-sergeant, so that each is supreme and responsible in his own sphere. The following scheme was adopted successfully in many cases in the administration of an infantry company, composed of a captain, five lieutenants, and two hundred and fifty men. In addition to the general duties each junior officer was given a specialty.

One lieutenant was mess officer. He attended to all things connected with the mess, the kitchen, and the mess funds, and he worked in conjunction with the mess-sergeant.

Another lieutenant was company supply or property officer, and in charge of all property records. He worked with the supply sergeant.

Another lieutenant was company police and sanitation officer. He made daily inspections and noted the activity of the noncommissioned officer in charge of quarters.

Another was company athletic officer. He had charge of all the games, exercises, amusements and recreation of the men in off hours.

Another was in charge of payrolls, muster rolls, service records, and monthly returns. He worked in conjunction with the company clerk.

The above suggested allotment of work is merely the mechanics of company administration. Of course, under the tables of organization, the lieutenants had their own platoons and platoon sergeants as therein provided.

Over all these stands the captain as the responsible head, the superior and the general director. He must formulate all policies, develop initiative, be-

[1] Recently of 71st Infantry.

stow praise and censure, and fix responsibility and punishments according to the nature and merits of each individual case. He must supervise all instruction, must himself lecture frequently on all topics, and otherwise do things which will build up the morale, discipline, and military efficiency of his officers, noncoms and men, working through his top-sergeant and officers.

The top-sergeant must be close to the captain, know his thoughts and ideas on all the above, understand him thoroughly and put into effect everything the captain orders or desires, so that in the absence of the captain, he, being in complete charge of the company, will know just how the captain wishes things done. If the captain does his part and has the interests of his men at heart, he will frequently consult and request his top-sergeant to make suggestions, advise, and otherwise recommend many things which the latter, on account of his closer contact with the men, is in a position to know. He should remind the captain, who carries the whole load, of many little details or needs which might, at the time, escape the captain's observation or direction.

It is a fundamental truth that progress depends upon many circumstances, chiefly the ability of the instructor to impart his knowledge and the capacity of the person instructed to receive, assimilate and retain what is imparted to him. If this complete harmony is secured, the top-sergeant will endeavor to make himself worthy and deserving of this confidence and respect, and his development will be in proportion to what his captain imparts, having due regard for his own inherent initiative and ambition.

The top-sergeant's mechanical duties, working directly with the company clerk, must be the morning report, the sick report, the guard roster and the duty roster. As the top-sergeant must at all times be able to account for all men, he must always be consulted by any company officer when any "detail" is required which would take the men away from the company. It must be thoroughly understood between the junior officers and the top-sergeant that they must not go over the top-sergeant's head or encroach upon his duties; that they can work in complete unison, all having the welfare of the company at heart; and that it is a simple thing for them to request the top-sergeant for anything they desire to be done, which he should know about, for wherever the superior encroaches upon the duties of the subordinate, he relieves the subordinate, just so far, of responsibility.

It has long been the custom for the men to request permission of the top-sergeant to speak to the captain, and the reason for this is that it enables the sergeant to handle anything that he can and should, and he thereby saves the captain from needless bother and enables him to give his whole attention to more important matters. Likewise, the top-sergeant should regulate all passes or privileges, except in a case of refusal in which the applicant thinks that he has been treated unfairly; then, of course, permission should be granted to speak to the captain.

The above suggestions are merely by way of introduction and only skeleton ideas of the various duties of each, and not at all inclusive, but it enables us to recognize that there is such a thing as a proper division of responsibility

and work and that there is a sphere in which each subordinate should have complete control and be responsible, so that the greatest familiarity with the work and efficiency in different individuals may be stimulated and developed.

We come now to a more minute consideration of the qualities and manner in which a top-sergeant should be developed. It is well known that the top-sergeant is the most trusted, the most highly paid, and should be the most efficient of the enlisted personnel in the company, and that the position, carrying as it does this dignity and higher pay, must, of course, carry greater responsibility.

On the physical side, we should select a man of excellent military bearing—strong, neat, and alert, with a good voice; one who can give a command or order in the military way, that is, with no trace of an apology for the order or any note of insincerity wherein it might be thought that he doubts its being obeyed promptly. It is a well-recognized fact that the tone of the voice and the manner of giving a command often determine the character of obedience; slow or quick, whole-hearted or half-hearted, offensive or inoffensive.

The development of the voice is by no means an unimportant piece of training in the development of officers and noncoms. The writer recalls a criticism which a wise old campaigner, now a high ranking officer, gave to a candidate at one of the early reserve officers' training camps: "Mr. Blank, the way you give commands doesn't sound as if you believed in them yourself. How can you expect men to obey them?"

Mentally, we should pick a man with a large stock of common-sense and with enough education to be able to keep a few company records and to study the usual military books. What we really want in a top-sergeant is common-sense, alertness, a correct idea of justice, and an ability to enforce discipline. If he has the wit of some of our Irish noncoms, then so much the better. He must also have a real appreciation of the power to relax at the proper time and yet be the strictest of disciplinarians when "business is on." He must feel assured that his captain will uphold him in his duties and acts.

The captain should always be accompanied by his top-sergeant on visits to his men in play time, for it gets the men accustomed to thinking of the two together, and they will realize that the top-sergeant is always acting and advising and planning with the captain for their welfare and interests generally, and, besides, it enables the captain to inquire individually of different men they meet and get his top-sergeant's opinion of their worth and progress.

The wise captain will always consult his top-sergeant as to recommendations for promotions within the company, for, as these newly appointed noncoms must work immediately under the top-sergeant, he should have a voice in their selection. The writer once recalls that he was considering promoting a junior corporal to be sergeant over the head of a senior corporal. In talking it over with his top-sergeant, the sergeant said: "Captain, you remember he was the first corporal we made. We told the men then we would go by seniority unless the senior was unfit, and this one is not. The men rely on your promise." Needless to say, the senior was pro-

moted, and he became one of our best and most reliable sergeants.

Another practice sometimes followed is to permit the top-sergeant himself to select a few of the privates whom he wants made noncoms, that is, for the captain to go entirely on his sergeant's "say so" concerning these men. This gives him a great deal of satisfaction and is conducive to an excellent feeling between the men and the top-sergeant. Likewise, it is a worthy practice, for the captain may have overlooked a deserving man. No man knows better than the top-sergeant that he cannot play favorites, and if he should have weaklings promoted, it will react on him.

If such relations as herein advocated are created, there would never be any such articles as, "Should Officers Associate Socially with Enlisted Men?" —frequently seen in the papers, and which discussions are most abhorrent and distasteful to the true officer and to the true soldier.

The writer recalls the following story of the old baseball-loving colonel who, one day, witnessing a game between some of his men, accepted their invitation to go to the bat. The colonel unfastened his blouse with its glittering eagles on the shoulder, laid it on the ground, and said, "Now, men, I am one of you—treat me right." As the colonel was rounding the bases after a mighty swat, the men, appreciating his spirit, yelled at him every nickname, pet name and usual baseball epithet, and commented on his manner of running until the colonel crossed the home plate. Picking up his blouse and putting it on, he said, "Now I am colonel again," amidst the thundering applause. Do you suppose the men lost any respect for that colonel, or that he was in any way ruffled by their informality?

The top-sergeant must be made to feel that in some things he is to act entirely alone, and that the captain does not want to know absolutely everything, unless he is powerless. The top-sergeant must, besides being a disciplinarian, be a diplomat, and he must be strong enough of his own initiative to handle incidents of slight infractions of good order and discipline, without resort to his captain. Of course, no punishment must be imposed without the captain's approval, but we know that the top-sergeant makes out the list of "fatigue details" and kitchen police and regulates the passes and privileges, and that is where he gets his power, which is a proper one, for any abuse is always made known to the captain in some way.

Once when the writer was a member of a general court-martial, a colored soldier was being tried for disrespect to an officer, disobedience to an officer and a noncommissioned officer, and for drunkenness. It appeared that a bootlegger had sold the soldier within the cantonment a bottle of rotten whisky, most of the contents of which the soldier had consumed in a couple of hours, and had then staggered into the mess hall. He refused to get out at the order of the mess-sergeant, and the mess-sergeant had called in the top-sergeant. The top-sergeant ordered the soldier to shut up and to get out, but the soldier's senses having been dulled by the rotten liquor, he had rambled on verbally, talked back to the sergeant, and flatly refused to go to bed. The top-sergeant, instead of "putting him to bed," had gone to the captain's quarters and requested the captain to come to the or-

derly room, and there the culprit was brought before his captain, whom he hardly recognized. Still he refused to keep quiet, and finally uttered the disrespectful language. The sum total of it all was the guardhouse, and charges. Now, as the president of the court sagely remarked, if the top-sergeant had done his duty and "put the soldier to bed" and had handled the soldier himself, there would have been no prisoner to serve a sentence and the United States would have gained and not lost. In other words, the irresponsible soldier in this case was permitted to aggravate his offense by improper handling. In many of his talks with the top-sergeant, the captain can instruct him how he must act in cases analogous to this one, and how he can save men from punishment by not obliging the captain to prefer charges.

Another workable idea is that the captain should encourage his top-sergeant in studying, by suggesting books and periodicals and otherwise intelligently directing the military and general broadening education of the man whom he has selected to administer the discipline and training of his company, and who is to represent him at all times in his absence.

The captain should frequently, at drill, together with all his officers, retire from the field and hand over the company to his top-sergeant. There is nothing so pleasing or so stimulating to the soldier as a chance to display his knowledge and qualities of leadership.

It was often the practice in the formation of the National Army to have a sergeant always supervised by an officer. Of course officers and men then had to be trained simultaneously, but too much supervision was destructive of initiative in the noncommissioned officers, and rather made them dodge than accept responsibility.

Finally, the captain must so instruct, by association, by conversation, by example, by acts, orders and advice, his top-sergeant, so as to get him in the frame of mind that he wants to develop himself to be a disciplinarian, a manager, a guide, philosopher and friend of each man in the company. The men will understand that situations may arise when the top-sergeant will be the judge, the prosecutor, and the attorney for the defense, all at the same time, for any one of them, and that, by his example, force and leadership, the morale of the company will be developed to a high degree. The men will undoubtedly respond to such a manager as soon as they are convinced of his sincerity, his impartiality and his efforts for their comfort and well-being, as well as their military efficiency.

Order and Discipline

By Carlos Bell[1]

THIS lecture is not to be on the manner of preparing field orders or viewed from the tactical point, but is to be given on the broad subject of orders. In other words, we must emphasize the point, that the very first thing to consider is the subject of military training, and the one which, unfortunately, is overlooked to a great extent, because of our absolute independence. But even if we are independent, we must all realize that it is better for our nation that we be called upon, not only as military men but as citizens of our glorious country, to obey laws and orders than to be hauled over the coals for violation of such. And therefore let us consider that the subject of Orders is one which has been horribly neglected, because until a man learns to obey the laws of our country, states, cities, etc., and the orders of his superior officer in the military service he is an undesirable citizen and soldier, and his punishment should be of sufficient strength to make him bear in mind that every man has his superior, and even our highest on earth must obey the laws of the Almighty or answer for violation of them.

The very first article in our Army Regulations covers the subject of Military Discipline and the first paragraph states: "All persons in the military service are required to obey *strictly* and to execute *promptly* the *lawful* orders of their superiors." Remember this paragraph says "strictly," "promptly" and "lawful." In other words, don't beat around the bush to find some flaw in the wording of the order to suit your own convenience but get the spirit of the order and obey it strictly. With regard to the promptness don't think that tomorrow will do for an order which must be carried out today; avoid getting into the habit of obeying an order after you finish what you are doing for your own convenience or pleasure. Lastly, be extremely careful about failing to obey an order of a superior because you think it is unlawful, for the responsibility rests with you.

We have many ways of imparting orders. General Orders, Special Orders, Orders, Letters of Instruction, Field Orders, Messages, Verbal Orders, and Requests should be considered under this heading. But no matter what form it may be, bear in mind Par. 1 of the Army Regulations.

Remember that character and discipline are the most important qualifications to build up and that "discipline" is the basis of everything in war. As Colonel Applin of the British General Staff says in one of his lectures: "Discipline is the *instant* and *willing* obedience to all orders, and, in the absence of orders, to what you believe the order would have been." He emphasized the two words *instant* and *willing* and stated that the whole of discipline is based on those two words.

The highest state of discipline is that which is instilled into one whereby he

[1] A lecture delivered to various commands in France by an officer of the A. E. F.—THE EDITOR.

does a thing or obeys an order because he knows it is *right* to do so, and not because he is afraid of punishment for doing wrong or violating an order. There is where the willingness comes in. The leader who succeeds in having his orders carried out by those under him because of their faith in him and love for him is the successful one.

And right here let me state that the man who cannot learn to obey orders properly and is undisciplined might as well get out of the service, as he is no earthly good to the service and will keep himself in "hot water" continuously.

Two or three years ago when the speaker was on duty as Inspector-Instructor of the National Guard, he made the following statement: "I would rather command a company of poor rifle shots who are well disciplined than one composed entirely of expert riflemen who are undisciplined." I was glad to see in the lecture given by an officer of one of the allied armies that he had made practically the same statement. Some looked at me with doubt when I made the statement, but later agreed that they would rather have a company which they could handle because the men were disciplined and would do what they were told to do than to have the company of experts who probably shot at what they wanted regardless of what target was designated, and would disobey many other things.

Unfortunately the greatest cause for our having so much trouble in getting discipline and obedience of orders is the failure of parents to attend to it in the bringing up of children when the laxity is becoming greater. Many parents think it is funny when small children are "sassy." Later on in life this trait grows until at the age of about fifteen they commence to feel independent; a boy is apt to tell "the old man to go to a warmer climate," and a young girl does not think her parents know anything about the worthless boy she is running with until it is too late. What does this give us in our manhood and womanhood? Violators of the law, persons who do not recognize an order, and feel so independent that they do not consider that they owe anything to their parents or the country. That is why we have had so much trouble from a disciplinary standpoint—officers and men violating orders in every imaginable way, because they wanted to do something else regardless of what effect it might have on our Army as a team, because they are free American citizens, the latter boast, in their minds, making up everything to constitute patriotism.

There are many things which we must observe to build up the discipline which calls for the instant and willing obedience to an order, but one of the best courses is our close order drill, remembering also the soldierly appearance and smartness in saluting.

Before I go any further I don't want any of you to get the impression that I advocate the iron discipline which the Germans had; because I do not. What we want is the discipline brought about through willingness and not through fear. But as it is impossible to build it up entirely by getting men to do what is right, we must have punishment awaiting the man who will not come through by any other method, and the punishment should be severe enough to make the offender hesitate the next time.

Now our close order drill is for the

purpose of building up discipline, and orders in this case are in the form of commands, a command being the *will* of the commander expressed in the phraseology prescribed in the book. Commands are divided into two classes, preparatory command and command of execution, the latter being "firm in tone and brief." "Indifference in giving commands must be avoided, as it leads to laxity in execution." Therefore all close order work should be full of "snap." Don't give commands in a half-hearted, sleepy manner because, if you do, you lose the snap in the men, and instead of building up discipline by close order drill you are boring everyone, losing your grip, and failing to derive the benefits. Take interest in the movements and your commands, get "pep" into yourself, correct errors, and don't let men wander around like a bunch of sheep. Most men can learn to march, so don't march them all over creation between commands because again you lose the "pep," the "snap," which gives you the *instant* obedience of orders.

Before issuing an order, consider whether it is absolutely necessary, if it can be carried out, if it will be enforced. Then make it an *order*, watch out for the phraseology and endeavor, as a general once told me, "to put the necktie of English on it and not a damn night shirt."

After issuing an order enforce it to the letter or else revoke it, because there is nothing so horrible for discipline as to have orders which no one attempts to obey for the simple reason that they know the person issuing it does not care anything about it.

I know of a colonel who once commanded a large post and who had a *volume* of post orders, but as they were not enforced some people never bothered about obeying them, which of course gave a very wrong impression as to what an order meant. The worst of it was the colonel knew that his orders were not being carried out, but he said, "I am covering myself in every way by orders." As a result most of his officers and men looked upon him as a "weak sister" and he was referred to as "Mamma." How much better it would have been if he had enforced his orders, or, if they proved faulty, to have revoked them.

I also know of a general who thought, because his men kept straight lines in passing in review, that they were excellent, but when it came to discipline they were rotten and his orders might as well not have been issued.

In another case, when a certain officer I know would give his orders, everyone knew he meant what he said and that he did not give or issue orders just to be busy; therefore his orders were carried out promptly and obeyed strictly. I might also add that he could use the sledge hammer if necessary to enforce those orders.

It is obvious which of the officers had the best discipline, and which was respected the more by the men under him. So it is wherever you go; every one admires the fair, square man who insists upon his orders being carried out to the letter, and he is generally a successful man.

Another case of quick action in enforcing orders, thereby letting all others know that the commanding officer meant what he said, was at an encampment for noncommissioned officers of the National Guard of a certain state. The major, a National Guard officer,

assembled the student noncommissioned officers and gave certain instructions, saying that *strict* military discipline would be observed. But as many had heard that same story about strict military discipline before, they thought they would pull the same old stunts the first night. Before they had time to swallow their breakfast the next morning each had been up to the Summary Court and lost a day's pay. This was the strong-arm method, but there was no further foolishness that week, or in the new class the following week, because all knew the major meant what he said. What was the result? All the noncommissioned officers stated it was the best camp they had ever been to.

Therefore, as our Field Service Regulations state, "the art of giving proper instructions and orders to troops is one of the most important features in the exercise of command."

Each individual need not be given a copy of an order, but important orders for all persons should be read at an assembly of troops. However, the posting of orders in a public place is sufficient, and according to law, "Ignorance of the law is no excuse for a crime." But in our Manual for Court-Martial, under the rules of evidence, an exception to the above is where enlisted men are charged with the knowledge of the Articles of War, which is based primarily upon the fact that A. W. 110 makes it one of the features of enlistments into the military service that certain of the Articles of War shall be read to every enlisted man at the time of, or within six days after, his enlistment.

One great error made by a lot of officers is the giving of an order to a drunken man, such as placing him in arrest in quarters, or ordering him to go to his quarters. He might obey that order, or start to obey it, but as his mind is not in condition to remember he is apt to fail in obedience. Therefore take the best step and have him locked up, thereby keeping him from further trouble.

So much for the manner of issuing and enforcing orders. No matter how conscientious and painstaking an officer is in trying to bring discipline up to 100 per cent efficiency, there are always some few individuals who ruin the reputation of an organization by their disobedience of orders and regulations. It is for such that we must have the strong-arm method which reaches to punishment by death, and it is only by the fear of death for such crimes that some men are held down. However, the self-respecting man will try to do what is right because he desires a good reputation. Therefore we must work to build up that self-respect.

The oath of enlistment in part is as follows: "and that I will *obey the orders* of the President of the United States and the orders of the officers appointed over me, according to the Rules and Articles of War."

On your commission as an officer you will find the following: "And I do *strictly* charge and require all officers and soldiers under his command to be *obedient* to his *orders* as an officer of his grade and position. And he is to observe and follow such *orders* and directions, from time to time, as he shall receive from me, or the future President of the United States of America, or the general or other superior officers set over him, according to the rules and *discipline* of war."

Obedience to orders and discipline.—Everything hinges on those factors in

the military life, and yet they are ignored at times.

Under the 64th Article of War we find "or wilfully disobeys any lawful command of his superior officer, shall *suffer death,* or such other punishment as a court-martial may direct." Here we see the extreme penalty for the wilful disobedience of orders. There is a difference between wilful disobedience of an order and a failure to obey an order, which I will not discuss here.

Often in the field a man is placed right up against it as to whether he will obey or disobey an order. If he obeys the order and the thing was radically wrong he has to stand the consequences, and, too, if he disobeys and thereby ties things up he must also take his medicine. But you must be ready to assume such responsibilities. As our Infantry Drill Regulations state, under the heading "Teamwork:"

When instructions render it impracticable to consult the authority issuing an order, officers should not hesitate to vary from such order when it is clearly based upon an incorrect view of the situation, is impossible of execution, or has been rendered impracticable on account of changes which have occurred since its promulgation. In the application of this rule the responsibility for mistakes rests upon the subordinate, but unwillingness to assume responsibility on proper occasions is indicative of weakness. Superiors should be careful not to censure any disobedience where the act was done in the proper spirit and to advance the general plan.

Why is it we have so much trouble in enforcing discipline and obedience to orders? In our games we have teamwork, someone gives orders, someone bosses things, and our training along that line ought to help and I believe it does. But at the same time we find so many *independent,* selfish individuals, who think that their comfort, their this or that, is the only thing to be considered in this world. As a result we find crowds on the rear platform or in the rear of a car who would not think of moving forward when the conductor asks them. No; they paid their fare and will not move. The same persons put their feet upon the seats regardless of how dirty they make it for the next person. Many fail to put in their income tax returns, or else "cut it" because they feel they won't be caught; if they can beat the Government or a railroad, "very good." Therefore, when we get those individuals in the service they are practically impossible unless they are man-handled a bit. Again we find the class who quit their jobs or stayed at home when they pleased, who in the service are in the A. W. O. class or doing as they wish in violation of orders of sanitation because they know it all, and, as a result, endangering the lives of others. And right here I wish to state that A. W. O. L. is a first cousin to desertion, and if our Army had been as strict along this line as other armies have been, there would be a few little crosses over some of the A. W. O. L.'s who should have been classed as deserters from the front line. I had four from my own battalion who were former M. P.'s sent to the infantry for discipline and who went back from the front line to a mounted organization, and were, I believe, only tried for A. W. O. L. If more stringent action had been taken, there would be fewer absent now.

In General Crowder's report, according to the newspapers, he stated: "Very few death sentences had been imposed, and none of those imposed for purely military offenses have been carried into

execution." Why weren't some of the death sentences carried into execution? We don't know, but I am positive that there would have been fewer offenses demanding the sentence of death if some had been carried out, discipline in general would have been better, and the lives of others not endangered, or even lost, because of the action of such individuals.

Why is it that so many officers and enlisted men think they can do just as they please? Why is it that so many officers think they can do certain things in violation of orders when they would punish their men for the same offense? I'll tell you. It is simply because so many have been permitted to get away with it. How did they get away with it? Maybe the officer who had the power to correct it failed to enforce discipline; maybe he put the man up before a court-martial and the court fell down on the job, or possibly everything up to this point had been to increase discipline, and "political pull" saved him. It is of no use putting a man up before a summary court officer who apologizes to the men because they are guilty and then "lets them off light." It is better for a court to let a man do duty than to have him in a guardhouse where he does less than the law-abiding soldiers and has all the comforts of home. However, in preference to being responsible yourself for letting discipline slide, by allowing your orders and the orders of higher authority to be disobeyed promiscuously, administer discipline as best you can, even if you do have to put it up to an easy-going court, and let the individual realize you are doing your best to enforce discipline, and perhaps some day he will land beyond the easy-going court and get a good jolt.

There are so many who think the pass or leave is theirs by right and that they should have it whenever they want it regardless of how it might affect the matters in the hands of higher authority, and when it is not forthcoming they pick up and are absent without leave. I have heard officers state, "Well, he couldn't get a pass." An officer I know who went off during the time his regiment was preparing for the front was very much surprised because he was to be tried for going away on a holiday, staying away on Saturday, which was taken up with only half a day's drill and an afternoon inspection, and of course Sunday was an off day. It happened while he was away that he was needed for certain duty and of course someone else had to do it. He learned a good lesson and others profited by his mistake. Two officers recently made a statement to the effect that they would not take any orders in any dinky place in the S. O. S., that they would do as they pleased, but I believe they finally decided they *pleased* to obey their orders.

Now, gentlemen, isn't it a wonderful record to go down in history that more than half of the charges against officers were listed under three heads: "Absent without leave, drunkenness, and conduct unbecoming an officer?" Isn't it a great record that was established recently in the A. E. F. when on one day there were 11,000 officers and more than 88,000 enlisted men absent without leave? Also look at the percentage of officers to enlisted men. Isn't it nice to see in print "Arriving Officers Ignore Discipline"? General Shanks said "the chief offenders were officers who absented themselves as soon as a ship docked." And yet com-

plaint was made to the Secretary of War that punishment was too severe in the Army.

A great trouble with many is that they spend more time finding flaws in an order whereby they can interpret it for their own benefit than they do in endeavoring to carry it out. I know of a case where an officer excused a certain man from drill because the man was working for him, saying, "I don't think the order contemplates that mechanics should drill." But the list of excused was furnished.

Again, "without delay" and "at once" do not seem to mean anything to many of the A. E. F., because crowds go out of their way and stay over beyond all reasonable excuse in Paris whenever they move. Naturally many routes do run through Paris, but it doesn't mean days of pleasure there.

The small things in military training are overlooked too much. Remember if a man learns the little things he will naturally obey bigger ones. Make your men feel their organization is the best, take pride in themselves, wear their uniforms properly and keep constantly after snap, and before you realize it the organization will be noted for its military bearing and efficiency.

If an order is faulty, request that it be changed, giving reasons, but don't just violate it. There are too many officers who violate orders, know they are doing something contrary to orders, but are taking a chance and waiting for their commanding officers to correct them. Don't get into this habit, but put your shoulder to the wheel; help your superior officer in carrying out his orders and those of higher authority. Be an example to your men. Be fair and square about your own orders, insist upon obedience, show no favoritism to violators and you will be respected by all and your men will have more confidence in you than they will if you prove to be a "weak sister." And your men will return to their civil pursuits better citizens for having served under a strong man.

Flank Movements of the Present

By 1st Lieutenant Eldridge Colby, 33d Infantry

THIS article is written to remove a current misconception—prevalent even among army officers—to the effect that, on account of the limitations of sectors in trench warfare, flanks are things of the past. The present war will be analyzed under four headings:

1. Flank movements in the old sense.
2. Flanks in defense in trench warfare.
3. Protection of flanks in the attack.
4. Utilization of flank attacks.

IN THE OLD SENSE

It has been too freely assumed that there is a new warfare which has supplanted the old, and which, with all its details of what the Germans call "technical fighting," its static, continuous front lines in face of one another reaching from the Alps to the North Sea, has vitiated all the old training in the war of movement with its advance guards, flank patrols, and combat patrols. But the so-called "new warfare" is in reality only a greatly magnified phase of the old warfare. Before lines are established, and after lines are broken, the old rules will hold and the old rules must be used as a basis of instruction.

The most important of the old rules is that of the extension of lines to get greater fire action and a subsequent concentration of fire and enveloping tactics (F. S. R., par. 164). General Foch says:

> The decisive attack is the employment of the mass, bringing moral and material superiority. We must develop material superiority, employing to good purpose the many guns and small arms supplied by the mass; this requires space. Hence the preference, in modern tactics, for flank attacks which permit of developing against one chosen point the desired superiority of fire, of carrying out flank or reverse fires of undeniable moral effect, allowing by an unlimited space the possibility of always maneuvering in mass. Hence the abandonment of the central attack so often practiced by Napoleon. He who employs it now is enveloped by enemy fire and cannot use all his own fire.

Both adversaries paid particular attention to flanks in the present war in the following instances:

1. In the retreat from Mons, the Germans were constantly trying to envelop the British left, and Sir Horace Smith-Dorrien was only enabled to retreat in turn to the Bavai-Maubeuge line and to the Cambria-Le Chateau-Landrecies line by the excellent flank protection afforded him by General Allenby.

2. The whole of the German 1914 offensive, through Belgium, was an attempt at a flank attack on a grand scale, while other Germans were executing what was probably intended as a mere holding attack on the frontier fortifications from Verdun and Nancy south to Switzerland. Not Paris, but the cutting off and capture of the entire French army, was the Teutonic object.

3. The defeat at the Marne in 1914 may have been due to an inspiration of Foch, but the German rout was the result of a successful assault on their right flank.

4. The Germans, beaten at the Marne, next tried to force a way through Flanders and Picardy, flank-

ing the entire French army. The subsequent "race to the sea" was a successful attempt on the part of the French General Staff to forestall this move and prevent encircling.

5. Many smaller exposed flanks had to be covered before the race to the sea was over and the long line continuous. For example, (*a*) Admiral Ronarc'h and his Marine Brigade had to retreat from Cortemarck because there was no cover on either side where the French troops had not yet completed their extension; and (*b*) at the final defense at Dixmude, the same commander had to retire because the Germans swept around his flanks and threatened him in reverse.

6. In Serbia, in 1915, the withdrawing of the army from the Danube and the traversing of Albania was rendered necessary, not on account of the Austro-Germans in front, but on account of the Bulgarians on the right flank threatening and actually cutting the lines of communications.

7. In Mesopotamia, the forces employed were so small that flanks had to be guarded continually. Gen. Sir Stanley Maude's successes against Bagdad, Deli Abbas, and Ramadie were accomplished by long night marches and distinct flank attacks.

8. In the Egypt-Palestine campaign, Gen. Sir Philip Chetwoode and General Allenby showed decided preference for flank movements, of which there may be pointed out as conspicuous examples: (*a*) General Chayter's New Zealand Light Horse at Rafa, which captured the town from the rear almost before action commenced; (*b*) General Chauvel's conduct of cavalry operations on the Brtish right from Beersheba to Jerusalem, and (*c*) the final turning of the Turkish right, and the sweep up the coast to get to the enemy's rear by British yeomanry, Australian light horse and Indian cavalry, which resulted in the capture of Damascus.

9. The entire success of the German campaign in Italy in 1917 was due to a huge assault upon the practically undefended Italian left flank.

10. The landing at Suvla Bay was an attempt at a flank attack, foiled by Turkish preparation.

But these are isolated instances far from the trench warfare common to the western front. When the race to the sea was over, the opposing forces were spread in long, thin lines from the Alps to the Channel, and had been spread that way to preclude the possibility of exposing their flanks. (In Macedonia the line extended practically from Salonica to Valona.) Then it was that people began to say that, unless we consider monitors firing on the Germans along the seacoast near Ostend, flanking movements were no longer possible and that flanks were no longer of concern in modern warfare.

FLANKS IN DEFENSE IN TRENCH WARFARE

Warfare, even trench warfare, is never static. Col. Paul Azan has insisted on the phrase "warfare of positions" rather than "position warfare" or "trench warfare," emphasizing all the while the element of movement which always comes, whether expectedly or unexpectedly. And where there is movement, there will be flanks. "Flanks must be protected either by reserves, fortifications, or the terrain (F. S. R., par. 122). The following are examples of flank elements in the so-called "trench warfare:"

1. The "broken line" trench, now universally favored, screens loopholes, and

gives flanking fire from one point across the front of another.

2. A line of trenches does not preclude flanking fire. The fortunes of separate small combats in holding this or that desirable piece of ground leave small salients; and every salient not only flanks the enemy's front line but has its own sides flanked at the apex. (*a*) At Gallipoli, "Asiatic Annie" was a menace on the right flank, (*b*) a Newfoundland platoon held six traverses, of which four were exposed to enfilade fire,[1] and (*c*) the right flank of the Manchester battalion was enfiladed, even exposed to fire from the rear. (*d*) At Ypres, stray bullets were "coming even obliquely from the rear," and the salients were always enfiladed. "Almost every spot in either line is overlooked by some adjacent ridge or enfiladed from some adjacent trench. It is disconcerting for a methodical young officer, after cautiously scrutinizing the trench on his front through a periscope, to find that the entire performance has been visible (and his entire person exposed) to the view of a Boche trench situated on a hill-slope upon his immediate left. And our trench line, with its infinity of salients and re-entrants, is itself only part of the great salient of *Wipers*."[2]

3. Automatic rifles and machine guns are preferably used for flanking fire in attack or defense, whether placed in the front, support, or reserve lines. The Germans have always insisted on this point. Gen. Sixt von Arnim published an order stating that the idea of having a continuous front line at the moment of repelling attack must be abandoned, and that reliance must be placed in isolated shell-hole "nests," "pill-boxes," etc. He ingeniously arranged the German wire so as to lead attacking troops into seemingly easy lanes, where they would be flanked by pill-boxes to right and left.

4. Strong points and centers of resistance are built on the principle that so long as garrisons of appropriate size remain in action in these an enemy cannot advance past that point, however he may have shattered the troops in the intervals, for by so doing he would have to move by the flank under fire. This is protection of the flanks, as referred to in our Field Service Regulations (par. 122), protecting the troops on either side of the gap by means of both reserves and fortifications and, if the defenses have been well sited, by the terrain as well.

5. "Flank protection is the duty of the commanders of all flank units down to the lowest, whether specifically enjoined in orders or not. This applies to units on both sides of gaps that may exist in the combat line" (F. S. R., par. 122). When the line is broken, the flanks of units to right and left must be protected and strengthened by reserves who counter-attack the enemy on the flank, using the flanks of the gap as pivots, and immediately dig in and form what is known as a "switch line," continuing the old trench line around the break. (*a*) It is first necessary to fill the gap, as Foch filled it at Montdidier, or as General French's 10th and 16th battalions of the 1st Canadian Brigade filled the gap at Ypres on April 23, 1915, when the recoil of the French Colonials before the German gas had exposed the left flank of the 3d Canadian Brigade. (*b*) Unless such gaps are

[1] Gallishaw: "Trenching at Gallipoli."
[2] Ian Hay: "All In It."

promptly filled, the threat to the flanks of the units still in the line may cause retirement of unbroken troops who are holding the enemy well, as in October, 1914, in front of Ypres, when the 9th Lancers, who held superbly, were left up in the air when the 57th Wilds Rifles (Indians) retired on their right and the 5th Dragoon Guards on their left. The British retreat in March, 1918, was entirely due to General Gough's retreat, uncovering General Byng's right flank for a dangerous space of time.

PROTECTION OF FLANKS IN THE ATTACK

The attack discussed in this article is the attack in trench warfare which is always highly organized and carefully prepared, and all tactical orders, even those for the smallest units, provide for flank protection.

1. The most elementary form of an attack in trench warfare is a raid in which flanks are protected by either or both of two means: (*a*) A "box barrage," (*b*) strong blocking posts, barriers, and defensive screens of bombers, rifle grenadiers, and automatic riflemen along communication and circulation trenches.

2. Platoon scouts for keeping in touch, automatic rifle sections on right and left are detailed on the flanks of small units to guard against gaps which may spring up during an advance, resulting from loss of direction. Captain Nobbs of the London Rifle Brigade has continually emphasized this point.[3] The same insistence on keeping in touch appears in order after order. Major Bertrad has said:

The battalion of infantry acts in a certain zone, limited in width as well as in depth. It is framed. The fact of being framed makes it unnecessary for its commander to cover his flanks *as long as his lateral tactical liaisons are perfectly maintained.*[4]

But they are, as a matter of fact, seldom perfectly maintained; that is why automatics are universally carried on the flanks.

3. "After the objective has been attained, it is the duty of the bombers to assist advancing forces to get in touch with their allied units on the flanks."[5]

4. (*a*) At Loos:

On account of uncut wire, the people on our left never started at all. . . . The result was that after forty-eight hours' fighting, our whole attacking force, instead of forming a nice straight line, had bagged out into a series of bays and peninsulas. Our crowd wasn't even a peninsula. For an hour or so it was an island.[6]

(*b*) The necessity for flank protection was again demonstrated by troops at Regina Trench on the Somme and an "infernal and continuous bombing at our flank barricade."

Because we were on the extreme right of the line, we had to institute a double defensive, as we had Germans on our front and on our flank, the whole length of the trench to the right of us being still held by Germans. There we had to form a "block," massing our bombers behind a barricade which was only15 yards from the barricade behind which the Germans were fighting.[7]

5. General Foch says:

Nowadays an attack organized in mass to develop all its power of fire and

[3] Nebbs: "On the Right of the British Lines."
[4] INFANTRY JOURNAL, October, 1918,
[5] Major Wood: "Notebook of an Intelligence Officer."
[6] Ian Hay: "All in It."
[7] McClintock: "Best o' Luck."

of shock can only act straight to its front. Abandoned to itself, it has its flanks exposed to the attacks or counter-attacks of the enemy. Yet its only chance of success is a straight, rapid and continued advance. The masses cannot be rapidly moved from left to right on the battlefield because the extent of the fronts does not allow it any more.

Two examples of endangered flanks which arose from this circumstance will be sufficient:

(*a*) On October 31, 1914, the Germans drove a huge column along the Menim road into the British salient and exposed an evergrowing vulnerable flank. This flank was promptly attacked from the north by troops from the British 1st Army Corps, the 1st Division, and part of the 2nd Division, and Germany lost the first battle of Ypres.[8]

(*b*) On August 16, 1915, at Gallipoli, the Worcesters pushed so far forward that their entire force was endangered, so that the Manchesters had to be sent out to find and reinforce them, without results.[9]

6. Thus it becomes a cardinal principle for the consideration of the staff to guard the flanks of an attack, of which three examples will suffice. It is a principle especially insisted on by Ludendorff, who says that reserves are chiefly useful to guard against flank counter-offensives.

(*a*) When the attack takes place our division will go straight ahead, for Longuevil and Delville Wood, while the next division makes a lateral thrust out to the right, to push the Boche out of Trones Wood and cover our flank.[10]

(*b*) One division, pushing northward against the 10th Bavarian Division, penetrated the enemy's third position at High Wood, having their flank supported by cavalry. The cavalry (Dragoon Guards and Deccan Horse) made their way up the shallow valley beyond Bazentin-le-Grand, and then set to work to intrench themselves to protect the flank of the advancing infantry in High Wood.[11]

On September 27-28, 1918, American troops took Montfaucon and adjacent villages with the 2d Colonial French Corps protecting the right flank of the American advance.[12]

UTILIZATION OF FLANK ATTACKS

On the offensive the best results can always be obtained by making the most of flank attacks.

1. The German scheme of "filtering through" minor breaks in a thinned line with small bodies of men both in an attack proper and in counter-attack, is an attempt to strike his enemy on the flank with machine-gun and rifle fire.[13] At Chateau-Thierry on July 15, 1918, for instance, where a regiment of the 3d American Division prevented the Germans crossing at certain points on its front, the Germans, who had gained a footing, pressed forward on either flank, and before the Americans repulsed them the regiment of the 3d Divison found itself firing in three directions.[14] These were sound principles, but the Germans failed in this instance.

2. General Ludendorff, other German officers, and many allied generals have insisted that offensive reserves

[8] Pollard: "The Story of Ypres."
[9] G. B. Hurst: "With Manchesters in the East."
[10] Ian Hay: "All In It."
[11] Buchan: "The Battle of the Somme."
[12] General Pershing's Report.
[13] General Pershing's July 3 "Report of fighting around Vaux."
[14] General Pershing's Report.
[15] INFANTRY JOURNAL, December, 1918.

must be put in "where the enemy is giving way and not at the point where he is holding out. Break through and roll up from the flanks."[15] Success will depend upon how thoroughly the encircling movement is carried out upon a strong point which still resists and which must still be kept under frontal fire. This has frequently been done effectively by letting tanks keep up the frontal fire while infantry swept around to the rear. It was by clever flanking movements that troops of the American 91st Division, fighting with the French in Flanders on November 3, 1918, captured Spitaals Bosschen, a difficult wood extending across the central part of the division sector, reached the Escaut and penetrated into the town of Audenarde.[16]

3. The same holds true on a large scale:

(*a*) At the first battle of Verdun the Germans were aiming to break through, cut the line of communication between Paris and the Alsatian-Lorraine frontier fortresses, and roll up from the flanks.

(*b*) The March-July drive of 1918, stopped at Montdidier, was aimed at the junction between the French and the British with the idea of trying to "divide and conquer" by rolling each up from the flank.

(*c*) The later, fifth, 1918 German offensive, the attack across the Aisne from Compiegne to Rheims, was not, as is so often stated, another drive on Paris, but an attempt via Epernay to outflank the allied armies which stretched southeast from Rheims.

(*d*) The allied success in the Balkans in 1918 was due to the fact that they broke the Austro-Bulgarian line from Doiran to the Adriatic at exactly one point—Strumnitsa—which enabled them to threaten the flanks of the rest of the line and cut communications.

(*e*) The Germans were driven back in the second battle of the Marne from Chateau-Thierry to the Vesle, not because the Marines were in the Bois de Belleau, but because General Foch hit and crumpled the German right flank from Soissons south.

(*f*) The Italian victory in 1918 was so complete because mobile detachments crossed the Livenza and Tagliamento rivers and from Udine threatened the flanks and, in fact, the whole line of march of the Austrians, who were falling back to the south of that point.

4. A salient, we have said, is outflanked by its very position. It can be enfiladed from the front, and, since it is at the center of a semicircle, can be subjected to an enormous concentration of fire. But the most successful attacks upon salients are not, like at Verdun, those launched at the apex; but are like the German counter-attack at First Cambrai, like the Franco-American victory at St. Mihiel, like Foch's August victories at Montdidier, attacks from two directions at the base of the salient which envelop and cut off the troops defending the salient itself, subjecting them to fire in reverse—the ultimate object of all flank attacks.

5. (I) To look at the western front on a still larger scale, and to think of the entire line from Belfort to Nieuport as a single force under a single generalissimo is to give a new idea of a right flank, a left flank, and a center.

[16] General Pershing's Report.

In fact, that is exactly what General Foch did—General Foch who made his fame by talking about right, left, and center in the first battle of the Marne.

(*a*) The battle of the Hindenburg Line was won in September, 1918, by the judicious application of successive flank attacks aimed at the German lines of communication. The battle was won because certain of our old rules could be applied. "The attack develops into two parts: one whose task it is to actually assault the hostile position at selected positions; the other whose task it is to threaten or to actually attack all other parts of the enemy's line, in order to hold the hostile troops to their position and to prevent the strengthening of the points to be assaulted" (F. S. R., par. 163). "A combination of a frontal attack with a flank attack promises the best results. The enemy is attacked in front by part of the force, while the remainder is directed against one of his flanks with a view to enveloping it. A successful envelopment of both flanks of the enemy, simultaneously with the frontal attack, is made possible only by a decided numerical superiority on the part of the attack" (F. S. R., par. 164). "Strategical considerations direct the attack toward that flank of the enemy where, if successful, it will drive him away from his line of retreat" (F. S. R., par. 168).

(*b*) Foch was ready to begin. The armies stood along the Hindenburg line. Foch hit the German left on September 26 with Liggett's 1st American Army and Gouraud's 4th French Army to east and west of Verdun. At the same time he hit the German right in front of Ypres with King Albert's Belgian Army and Plumer's 2d British Army. Then, having worried the German concerning his flanks, Foch struck the center back from Valenciennes to Laon with the British armies of Horne, Byng, and Rawlinson and the French under Debeney. The British attack drove in the German center, which was forced to retreat further, all the way from Lens to the Argonne, in the face of steadily increasing pressure on both flanks. The 2d American Army then struck across the Meuse towards Sedan, Mezieres and Montmedy, and in November the other line of communication, through Liege and Namur, was threatened with a renewal of the attacks.

(II) As General Pershing stated in his final report, "We had cut the enemy's line of communications, and nothing but a surrender or an armistice could save him from a complete disaster." The war was over. The war was won by a general by the name of Foch, who never forgot—when thinking of small units, large units or extraordinarily large units—that flanks are vulnerable and that flanks had not gone out of existence.

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Employment of Field Artillery with Infantry

By Colonel E. L. Gruber, Field Artillery

THE war which has just been brought to a successful military conclusion has, notwithstanding its many novel and unexpected features, again shown that the fundamental tactical principles remain unchanged. During the three years preceding our entrance, we listened to and believed many false prophets, and after we got in were naturally influenced by the opinions and methods of our Allies. Up to March, 1918, it seemed that stabilized warfare was the accepted rule and that maneuver warfare would be the exception. But, paradoxical as it may seem, the reverse is and always will be the case. The history of the war will show that stabilized warfare is a condition resorted to by the weaker side, and is purposely chosen as a defensive expedient either to await reinforcements or to take up the offensive in some other theater of operations, or to await the time when the prospects of a successful conclusion by a resort to maneuver warfare are propitious. The objects of stabilized or position warfare can be attained only when both flanks of the chosen position are impassable. In any event a resort to stabilized warfare will always prolong the war and bring more suffering in its wake. No nation accepts such consequences willingly. The losses will be greater, for although daily minor combats are fought in many places with smaller losses, the total losses both in men and material are in the end far greater than those occurring during the maneuver operations and the decisive battles terminating a maneuver campaign. For that reason a determined commander will always prefer maneuver warfare and resort to stabilized warfare only as an expedient in an emergency. Or if these conditions are imposed upon him by his opponent, he will immediately take up an energetic offensive, knowing full well that, for every day that he delays, he is playing the enemy's game—to gain time.

All of these things point to the necessity of basing our tactics, organization and armament, not on a rigid conception of special conditions, but on their adaptability to and suitability for a wide range of conditions and situations. This is the essence of maneuver warfare, because it involves a combination of fire and movement in defensive as well as in offensive operations. In stabilized warfare movement is restricted, and the opportunities for fire are greatly increased. This has led many enthusiastic artillerymen to characterize the present war "an artillery war." Such is emphatically not the case. In certain phases, what might be called the mechanical phases of the war, the artillery undoubtedly played a dominant rôle. During these phases there was practically no progress or decision. To obtain a decision our tactics and our organization must be based upon, and adapt themselves to, the vital phases of war. Our Field Service Regulations and Infantry and Field Artillery Drill Regulations reflect this spirit throughout. It must be gratifying to those officers who were responsible

for their formulation to know that the tactical principles which were enunciated therein are as sound today as they were when the present war began.

The vital phases of a war find expression in maneuver warfare in which the infantry is, as ever, the dominant fighting arm. Every action of the field artillery should therefore have an influence, either direct or indirect, toward making the support which it can give its infantry as powerful as possible. The closer the cooperation with the infantry the more quickly and successfully will the latter attain its objectives. There must be physical contact and, to maintain this, the artillery operating with the infantry must be mobile and light enough to follow and support it anywhere. This artillery we call the division artillery. Its organization and tactics should be based on the primary function of supporting the infantry. To reinforce and protect the division artillery and to permit it to carry out its primary functions, we have field artillery of heavier caliber as follows:

(*a*) Medium howitzers such as the 155-mm. field howitzers, which, when they reinforce the light artillery in fire of destruction, are classed as division artillery, whereas when used for counter battery work they function as corps artillery.

(*b*) Medium guns, such as the 4.7-inch and the 60-pdr. field guns which protect the division artillery by their counter-battery fire on the hostile artillery. The longer range of these guns also permits their use for harassing, interdiction, destruction, concentration and similar purposes, in and beyond the zone of the division artillery. For this reason they function as corps artillery.

(*c*) Heavy field howitzers such as the 240-mm. howitzers, which are used to reinforce the medium calibers in heavy bombardments of strong field works and in counter battery. They are organized as army artillery to be allocated by the army to corps and divisions.

(*d*) Heavy field guns, such as the 155-G. P. F. gun, which is used to counter-battery the distant hostile artillery and for interdiction in the back areas. They are organized as army artillery and often allocated to the corps artillery for counter-battery.

The work of counter-battery is usually carried out under the corps, while the harassing, interdiction and destruction fire in the back areas is usually carried out under the army. For this reason, the terms corps and army artillery have attached themselves to medium and heavy field calibers respectively. But the subdivision of division, corps and army artillery is organic only, not made for the purpose of creating different types of artillery, but for convenience in making a proper tactical allotment of the artillery of a field army and to insure a proper economy of forces. It carries out the well-known principle of firing line, support and reserve, common to all combat tactics. All groups of artillery, whether corps or army, must work in close cooperation with the division artillery, which, in turn, is the younger brother of the infantry. This close cooperation can be obtained only when all the artillery normally functioning within the army is indoctrinated with some tactical and combat principles.

To return to the division artillery. Its employment is determined by the tactics of the infantry which it supports. For this reason, the division artillery

must work in close cooperation with the infantry. This requirement has led to a tactical (but not organic) subdivision of the division artillery into:

(*a*) That retained under control of the division commanders and fought under command of the division artillery commander.

(*b*) That assigned to the direct support of infantry units under tactical control of infantry commanders.

The larger part of the division artillery is included under (*a*). In addition to the light guns, it includes all the howitzers allotted to the division. With this artillery, the division commander is able to carry out rapidly any destruction fire or concentration on important and decisive points in the zone of operations of the division. But to get the best results from such destruction and concentrations, the division artillery commander must have complete and accurate information concerning the progress of the infantry. No matter how close the liaison between the field artillery and the infantry may be, it is usually impossible to maintain this in combat so as to anticipate the immediate needs of the infantry and to render the timely close support in local actions when resistance is encountered. To insure this, a suitable proportion of the division artillery is assigned under tactical control of the infantry commanders. According to mission and employment this artillery is tactically subdivided into (*a*) infantry batteries, (*b*) accompanying guns.

Infantry batteries are usually allotted at the rate of one for each regiment making the attack. This does not mean that they are *always* allotted in this ratio. It depends more upon the nature of the terrain and the mission of the infantry. In any event, the allotment should not be made except after consultation with the division artillery commander, who as chief of artillery is the adviser of the division commander. An unnecessary allotment of infantry batteries merely leads to their misuse or enforced idleness. Instances of such cases were very numerous in the last two months of the war, during which time they were thus used by us. Most of the faults were due undoubtedly to a lack of understanding what the purpose of these batteries was or how they should be used. Some infantry commanders believed that the artillery had no other mission than to deliver any and all fire called for by the infantry. This is correct from the artillerymen's point of view, provided the infantry commander knows the powers and limitations of the battery supporting him and is competent to give the battery commander reasonable and proper missions. Unfortunately the previous training of our infantry commanders had never prepared them to exercise such tactical judgment. In principle, what is required is the immediate application of effective artillery fire at the points of resistance combined with the successful maneuver and attack by the infantry at points where the enemy is weakening or giving way. Now no fire can be effective unless it is accurately placed; this means good observation by the artillery commander. Nor can fire be effective unless delivered at the proper time; this means close and direct liaison between the infantry and the artillery commander, and for this they are jointly responsible.

In fighting an infantry battery, the most important consideration is the assignment of proper tactical missions

by the responsible infantry commander. The execution of that mission he should leave to his battery commander, whose relations to the infantry commander are similar to those of the division artillery commander to the commanding general of the division. Combined training must therefore be conducted to insure cooperation and mutual understanding. Such questions as to the position to be occupied, the manner of occupying the position, the subdivision of the general artillery mission and assignment to sections or platoons, the methods of fire and other artillery technique should be left entirely to the artillery commander. The infantry commander has too much to do to be worrying over such matters. Furthermore, the artillery commander, if he is properly trained, is better able to do these things than is the infantry commander. The best results will be attained only when the infantry commander consults freely and frankly with his artillery commander and has complete confidence in him.

In fighting an infantry battery, the first consideration is mobility. The battery will seldom be used as a complete firing battery. More often the fire will be conducted by platoons or sections under these subordinate commanders. Frequently one platoon will be firing while the other is advancing by echelon to keep up contact with its infantry. Firing will usually be at ranges under 2,000 yards. The proximity of the guns to the infantry will bring up many opportunities for short and frequent attacks on the numerous targets that present themselves. To obtain decisive results, the fire must be delivered at the right time and at the right target. For this reason, artillery subordinate commanders will be frequently thrown upon their own initiative and judgment as to what targets to attack. To hesitate in such a case would be fatal. A prompt and bold decision will generally bring success and avoid losses not only to infantry but to the artillery itself.

Refinements in the occupation of the position or in the physical protection of the guns is not so important. If the emergency requires it, a section or platoon commander should not hesitate to place his guns in the open. Protection is, of course, always desirable and should be sought, particularly from air observation. The battery should not go into position too near to infantry in support or reserve because of the avoidable losses which such proximity would cause these troops from hostile fire directed at the battery. The most favorable positions are found in slight folds in the ground, or in rear of hedges, road embankments, bushes, fences, etc. Protection from hostile artillery fire is not so important because the hostile batteries are receiving their full share of attention from our own division and corps artillery. A timely reconnaissance to make sure of the routes of advance, and preparations to cross difficult terrain or to overcome obstacles, are absolutely essential. Such measures must be carried on not intermittently, but constantly. The ammunition must be husbanded. Every round fired must be a necessary expenditure and count for something. Above all, the infantry commander must be kept accurately informed as to the status of the ammunition supply, otherwise he may commit himself to a line of action and find himself abandoned by his artillery at the critical moment.

Accompanying Guns.—Whereas the

infantry batteries support major infantry units, smaller infantry units in maneuver warfare must be supported by individual guns to combat machine guns, tanks, "pill boxes" and strong points which hold up the progress of these advanced infantry units. The character of the terrain and the critical nature of the tactical situation will often make it necessary to place light mobile guns in close support of the front infantry lines, regardless of the losses which the artillery may suffer thereby. Unless the situation demands such action, no infantry commander who clearly understands the limitations of such accompanying guns should require them to be exposed unnecessarily, particularly if they can produce the same effect and observe this effect from a nearby position under cover.

To lay down a general rule that accompanying guns will always be thrown into the first infantry lines is therefore faulty. Such action will involve unnecessary and avoidable losses in personnel and material, resulting particularly from the high efficiency of machine-gun fire. These accompanying guns should be so emplaced that they can neutralize or destroy these hostile machine guns, at the same time not exposing themselves unnecessarily to the effective fire of the latter.

There will, however, be many occasions when the accompanying gun must be in the front lines with the infantry, regardless of the losses which the artillery may suffer, as, for instance, when it is necessary to quickly overcome resistance at a strong point or to force possession of a bridge, a crossing, a farm compound or other locality prepared for defense, which, due to the close character of the terrain, does not permit observation or conduct of fire from a distance.

In cases where time is the important factor and the need for effective fire is immediate, no time should be wasted in the search for a covered position. A prompt and bold decision will generally reduce subsequent losses and insure success. The opportunities for such action will be frequent, not only in the many operations incident to a big attack by large forces, but also in simple advance-guard encounters or in a retreat, in both of which cases a small artillery force should always be allotted as an integral part of small combat units—companies or battalions. In the operations on the Russian front, when small units operated over larger areas and were separated by distances precluding close support, the use of single guns and platoons in this manner has been the direct cause of success.

Conditions of weather frequently make it impossible, particularly during an attack, to count on the support of infantry batteries or of the division artillery. Operations conducted during heavy fogs, mist, rain or snow, or in close and wooded country, therefore present ideal conditions for the use of the accompanying gun. The military history of the war is full of examples where single guns or platoons accompanying small infantry units have in sudden encounter been able to go into immediate action for direct fire, and by their surprise fire were able to completely demoralize the enemy, thus permitting the infantry to carry its objectives with few losses. A force which, in such difficult situations, has available one or two accompanying guns under aggressive leaders who know how to take advantage of fleeting opportuni-

ties possesses a moral advantage over a numerically superior enemy that the latter can seldom overcome. The moral effect upon our own infantry must also be considered. The fact that a successful counter-attack may leave the guns in the hands of the enemy is a *quid pro quo* that must be taken into the bargain. Today it is no longer a shame and dishonor to lose guns to the enemy, provided the artillery has exacted the full price for such loss.

The accompanying guns should be assigned to advance-guard detachments and to first-line infantry battalions for the purpose of attacking hostile machine guns, intrenched infantry, tanks, "pill boxes" and strong points. On the defensive it is the ideal anti-tank gun. Unfortunately our field artillery in the present war did not use the accompanying gun effectively. This was probably due to the lack of training of both infantry and field artillery commanders in its tactical use, and to the tendency of many field artillerymen to interpose technical objections to the use of a field gun in the front line. They maintained that the desired support and results could be obtained by keeping the light guns under cover and conducting fire from the infantry lines. But they failed to consider the difficulties of communications, the immediate necessity for a few effective rounds, and, above all, the moral effect which the presence of these guns would have upon the infantry. The infantry wants the accompanying gun, and the artillery should give it, even if it suffers heavy losses in doing so. In it we have that physical contact between the infantry and the field artillery without which cooperation can never be real. This cooperation must be encouraged and perfected in peace by combined training, not only in our service schools but also in garrison, so that infantrymen and artillerymen will better understand how to fight together. The fruits of cooperation will be obtained not so much by talks on the subject but by actually working together. This should be the primary object of our service schools.

The accompanying gun has also a moral effect upon the field artillery. It is the foundation of that offensive spirit of the field artillery which in the Napoleonic wars found its classic expression in the battalion gun and was resurrected by our enemies in the present war long before it appeared on the western front in 1918. Many field artillerymen have been reluctant to adopt the accompanying gun in principle and have advocated turning it over to the infantry. Their reasons are usually based on failure to obtain the desired results with it and to the losses which the field artillery has suffered in its employment. No real field artilleryman is, however, willing to withstand the reproaches of his comrades on these grounds. An infantry battalion commander now has so large and mixed a command, and so many things to consider in combat, that he cannot conduct his battalion efficiently and be expected to prescribe how his accompanying guns should be fought. He must be given an artillery assistant, performing the functions of a battalion chief of artillery. To him he should assign the missions as they arise, leaving the execution of the mission to the artillery officer. Experience has shown that the accompanying gun frequently failed to accomplish results because the infantry commander, having so many other mat-

ters to consider, forgot that he had close at hand such a powerful weapon as an accompanying gun.

The light field gun is not suitable as an accompanying gun. What we need is a gun of the range, power and mobility of our mountain howitzer. It should not, however, be transported as pack artillery, because the pack mule is an expensive means of transport, particularly when we consider ammunition supply. A two-horse limbered carriage, with a gun light enough to be easily man-handled by four or five men, similar to our mountain gun, would answer the purpose admirably. Such a gun can also be used in the trenches with very little preparation of the emplacement. Certainly less preparation would be required than was made for our trench mortars, which usually fired from the second or third-line trenches. By providing panniers, the two draft horses or mules could be taken out of harness and used to pack ammunition from the combat train, nearby and under cover, to the gun position. The accompanying gun will also be the anti-tank gun. Furthermore, it will make unnecessary the 37-mm. gun with the infantry, a gun which has been found ineffective against tanks, "pill boxes" and well-protected machine guns. By providing a reduced charge and a special projectile or bomb, it can take the place of the light trench mortar, which it surpasses in mobility. So great are the possibilities of this accompanying gun that immediate steps should be taken toward its development and inclusion as a part of the field artillery. If we limit such a gun to the functions of an accompanying gun, as heretofore interpreted, it will stand idle nine-tenths of the time. This is another reason why it should be handled by the field artillery, because this arm will find many opportunities for its effective employment during periods when it would otherwise stand idle as an infantry weapon.

War-Time Construction

By Colonel Charles D. Hartman, Q. M. Corps (Infantry)[1]

BECAUSE of the condition of utter unpreparedness in which America found herself at the outbreak of hostilities, the building operations of the Army during the war of 1917 involved tasks of tremendous magnitude. The pressing need for the utmost rapidity of execution, added to the volume of the work itself, made the accomplishment of this undertaking one of the most remarkable, as well as one of the most interesting, of the manifold activities of the Army during the months just passed.

This article does not include accomplishments abroad, but deals only with the construction work in the United States. The country was suddenly confronted with the emergency of almost immediately supplying adequate shelter for the housing of an army of hitherto undreamed-of proportions, as well as shelter for many of the varied activities of such a force. The solution of the manifold problems involved in the successful accomplishment of this task was entrusted to the bureau at present known as "The Construction Division of the Army," a new staff department whose final strength was 1,500 officers and 17,863 enlisted men. While this large organization did not, of course, leap into sudden being, its growth was nevertheless quite rapid. The exigencies demanded that the development of the bureau should enable it to cope with the expansions and enlargements dictated by the War Department policies as they, in turn, were affected by the swift march of events overseas.

Prior to the epochal date of April 6, 1917, the construction work of the Army was in the hands of the Construction and Repair Division of the Office of the Quartermaster General. The officer then in charge of this division was Col. I. W. Littell, Q. M. C., who was later promoted to Brigadier General, Q. M. C., in October, 1917, and retired at his own request in February, 1919. The personnel originally under his direction consisted of only two officers, about a dozen clerks, and approximately the same number of draftsmen and technical men. On May 16, 1917, the Secretary of War delegated to Colonel Littell the task of erection of training camps and cantonments to accommodate the Federalized National Guard and the army to be created under the provisions of the Selective Service Act. Coincident with this assignment, Colonel Littell was given authority to make the necessary extension of his organization. In addition, he was further authorized to exercise certain new powers, among which was the right to communicate directly with the chief of staff and department commanders. It was not anticipated at that time that his duties would embrace more than the building of the camps and cantonments, and his title was "Officer in Charge of Cantonment Construction." For the purpose of rapid accomplishment of this task Colonel Littell was relieved from all extraneous duties. However, after the camps and cantonments had been built, the pressing need of other construction

[1] In charge Maintenance and Repair Branch, Construction Division.

of almost every nature upon a truly gigantic scale was so apparent that the Secretary of War imposed upon the efficient organization thus built up the duty of carrying on all construction work for the Army, relieving the various bureaus of the construction work which they hitherto performed as incidental to their respective duties and functions.

On February 12, 1918, the name of the organization was changed to "Cantonment Division," Quartermaster Corps. Subsequently, on February 19, 1918, the division was separated from the Quartermaster Corps and thereafter reported direct to the chief of staff. In other words, it became a separate bureau of the War Department, not attached to any of the established bureaus or corps. On this date Brigadier General Littell was relieved at his own request and Lieut. Col. R. C. Marshall, Jr., who had acted as his executive officer, was placed in charge of the division. Lieutenant Colonel Marshall was subsequently promoted to the grade of colonel, and on July 9, 1918, to the rank of brigadier general.

On March 13, 1918, the name of the division was changed to "Construction Division of the Army," which title it still retains. By the order of this date the former department division was separated from the Office of the Quartermaster General and set up as the Construction Division, reporting to the Assistant Chief of Staff in Charge of Operations. By the provisions of this order the division was given control over and charged with all matters in connection with the construction work of the Army in the United States, the Hawaiian Islands, Philippine Islands, Alaska, Porto Rico, and the Canal Zone, including the surveying and other necessary preliminary work on the sites selected, preparation of plans, procuring, inspecting and expediting of material, putting in place equipment of all sorts, construction of roads, wharves, sewer systems and water systems, as well as the maintenance of all of the Army's construction projects and the operation of public utilities on such projects. In general the division received control over all matters connected with, or arising out of, its manifold general operations and activities.

The office organization of the division includes the Engineering, Contracts, Administrative, Building, Accounting, Procurement and Maintenance and Repair Branches. Engineering has supervision over the preparation of all plans and specifications for cantonments and emergency construction, including buildings, water and sewer systems, roads, walks, wharves, drainage, heating, lighting, power, plumbing, railroads, docks, factories, shops, and other elements entering into this construction. Contracts, as might be inferred, passes upon all contracts and sub-contracts before they are signed, renders opinions on points arising in connection with interpretation of such agreements, attends to all matters relating to surety bonds, fire insurance, liability insurance, and determines what matters in dispute shall be submitted to higher authority for opinion.

The Administrative Division is concerned with all matters pertaining to supervising, developing and perfecting administration and operation in the Construction Division, and in coordinating the activities of the various branches and sections thereof. This branch also has supervision over cleri-

cal records, files, mail, and messenger service, settles matters of office policy, and keeps records of all officers and employes of the division. In addition, Administration also maintains supervision over coordination of labor rates and conditions at all construction points which are carried on under the Construction Division, and passes upon agreements in connection therewith.

The Building Division has charge of the construction of all sorts in connection with all work, executing plans prepared by the Engineering Branch, coordinating the supervision, expediting and completing of construction.

Accounting is concerned with all financial matters pertaining to the Construction Division.

The Procurement Division has supervision over the procurement, inspection, expediting and delivery of all materials mobilized through the Construction Division for use in construction work which it has in hand. This division also cooperates with the various committees and organizations which have been formed to stabilize prices and keep in touch with the market throughout the country.

The Maintenance and Repair Division, as the name implies, is entrusted with the operation, maintenance and repair of permanent and temporary army posts, camps and cantonments and other places where government construction has been done.

All projects under the control of the Construction Division are under the direct supervision of an officer thereof, who is known as the constructing quartermaster. He is responsible for speed and economy in handling the work and for the results obtained. His duties are analogous to those of the owner's representative on construction work being done by a contractor. The constructing quartermaster reports to the Construction Division at Washington through an officer known as the supervising constructing quartermaster, who, in turn, is charged with general supervision over several projects of similar character. This officer also maintains close relations between constructing quartermasters in the field and the office in Washington and acts in general as their Washington agent.

While the limitations of this article preclude the possibility of giving a detailed or exhaustive study of the mechanisms of operation of the Construction Division, a brief presentation of outstanding features may be made. The first step was the indication of its needs by a bureau or department. The matter was then passed upon by the War Industries Board, which, through its Emergency Construction Committee, selects and recommends a contractor to perform the work. The matter was then presented to the Secretary of War by the Construction Division, which stated the needs of the bureau, its request, the approval of the War Industries Board and the selection of the contractor and the request by the Construction Division for the needed allotment of funds. When the approval of the Secretary of War was received, the Construction Division entered into the necessary contracts, provided material when necessary, and thenceforth supervised the execution of the contract. The real obligation of performing the work rested upon the contractor.

The brief history of the life and expansion of the division given above serves to show that its growth was coextensive with the duties which were

imposed upon it, and that relative independence of action was granted the division only after it had become apparent that freedom of action and relief from interference on the part of any authority intermediate between the division and the chief of staff were essential to efficiency. The magnitude of the operations performed renders difficult visualization of its true proportions. Statistics, and even the statement that the authorized expenditures for construction work carried on under its direction totaled approximately $1,200,000,000, afford but colorless and inadequate conceptions of work done on a scale that staggers the imagination. The Panama Canal cost $375,000,000 and took ten years to construct. This enormous sum of $1,200,000,000 was expended by the Construction Division in less than eighteen months, for undertakings ranging from the building of rough wooden cantonments and camps to the most modern form of steel and concrete construction, and from the simple types of building required for the training camp to the erection of complicated industrial plants for the manufacture of explosives and material for chemical warfare. In general, and so far as the construction work which it accomplished can be divided into groups, it may be said that its work consisted in the building of:

(*a*) Camps and cantonments.
(*b*) Hospitals.
(*c*) Storage projects and terminals.
(*d*) Industrial plants.

Some of the work which it did cannot fall within any one of these classifications, but the bulk of the building which was done is more or less nearly related to some one of them.

The first emergency was the necessity of building the sixteen National Army cantonments and the sixteen National Guard camps for the training of the draft army and the Federalized National Guard. This task was imposed upon Colonel Littell's organization when he was first assigned to duty as Officer in Charge of Cantonment Construction. The Selective Service Act was not passed until May 18, 1917, and until this approval was received it was impossible to make intelligent plans for the accommodation of the forces provided for by this act. Not even the sites for the camps were selected before this date. Immediately after the passage of the Selective Service Act, however, boards of officers were appointed by departmental commanders to select suitable areas for cantonments for the training of the new army. These boards traveled all over the country, examined numerous possible sites, and made selections. The Cantonment Division had nothing whatever to do with the final selection, which was made by the War Department based on the recommendations of the several boards. From the construction standpoint, a number of the sites chosen were exceedingly poor. The work of the selection was not completed until July 2, 1917, when the authority for the last one of them was received by the Cantonment Division. In the meantime, the task of organizing the personnel of the division, the selection of men qualified for duty in Washington and in the field, the determination of the manner in which the work of construction was to be accomplished, the adoption of general plans, were performed by the organization of General Littell. Starting with a nucleus of two officers and a handful of clerks, he invoked the as-

sistance of the Emergency Construction Committee of the Council of National Defense, an organization composed of men of long experience and wide acquaintance in the construction field. Men were desired and obtained whose knowledge of construction work on a large scale was not only theoretical but practical. Their previous military training and knowledge of army methods of accounting were secondary. Their ability to handle men on construction work and their appreciation of the value of time were primary requisites. The country was combed for engineers and builders of national reputation, with the result that a number of such men accepted commissions.

In the meantime, in conjunction with the Emergency Construction Committee, a plan was drawn up for the actual conduct of construction operations. Urgent necessity demanded building on a huge scale with maximum speed possible. Use had to be made of every existing facility and organization that could be utilized to promote successful completion of the work. It was obviously out of the question to attempt to build up a government organization analogous to construction companies which could undertake the work of accommodating more than one million men in a time count of a little over sixty days. The solution lay in the adaptation to the work of the large commercial construction organizations of the country.

The ordinary methods of procedure were generally known, and each one was carefully considered by those in charge of the work and by the Emergency Construction Committee of the Council of National Defense. The latter was one of the subcommittees of that council designed to aid in the construction work incident to our preparations for the war. The necessity obviously was for a form of contract combining protection to both the Government and to the contractor, but which had extreme flexibility, capacity for adjustment to the abnormal conditions of the labor and material markets produced by war conditions, and which secured the utmost speed in actual construction work.

The lump-sum contract was, some years ago, almost universally employed, and for it many advantages were claimed. Given ideal conditions, stable material and labor markets, a clear conception of the construction desired, abundant time for the preparation of plans and specifications and capable bidders, this form of contract may work well. Under war conditions, however, such a form of contract was utterly impracticable. Barracks and quarters had to be designed to accommodate tactical units whose organization was changed and expanded materially after our entrance into the war. New types of buildings for special uses were made necessary for new hitherto non-existents in our Army and organized for special functions in modern warfare. As construction progressed, many such variations and all sorts of enlargements were found to be essential. In no case, when building was started, was the completed project clearly delineated or thoroughly fixed in the mind of anyone concerned.

A defect of the lump-sum contract is that nothing can be done until the drawings and specifications are complete, bids taken and examined, and the contract awarded. Such a contract is

inflexible in its very nature. With no clear concept of the completed project, it is inevitable that important changes, enlargements and additions must be provided for during the progress of the work, involving daily administration, inconvenience and expense, with inevitable lack of equity and consequent dissatisfaction on the part of one or both of the contracting parties.

Moreover, in unstable material and labor markets, the bidder, in order to protect himself, must place his figures high enough to provide for possible fluctuation. This involves a speculative figure unfair to the owner and contractor alike. It is a gamble, pure and simple. The contractor may be reimbursed to an extent greater than is warranted, or by an appreciable rise in the market he may not be reimbursed at all and may actually be driven to the verge of bankruptcy. For the purposes of the Government, therefore, a lump-sum contract was unanimously discarded both by those in authority in the Construction Division and by the Emergency Construction Committee of the Council of National Defense.

The same objections are inherent to a variation of the lump-sum contract in general use, namely, the lump-sum contract to cover the cost of the project so far as it can be foreseen, with a cost-plus provision for such changes and expansions as may be ordered later.

Another form of contract, admirable under certain conditions, but not adapted to the use of the Government during the war, is what may be termed the unit price form of contract. By this agreement a fixed price is set upon for construction units, as, for example, per thousand bricks in a wall or per yard of concrete in place. An estimate, unless it be speculative, must be based on an approximately accurate knowledge of the number of units to be completed, and conditions under which the construction must proceed. Obviously, the volume of work has much to do with the figuring of the estimates. Many of the objections inherent to the lump-sum contract may also be found in this method.

The agency form of contract is well known. Its advantages and objections offset each other. For undertakings of peculiar character, of great magnitude, in conditions where the utmost mutual trust and confidence can exist between principal and agent, it may work admirably. Under ordinary conditions, however, it is hazardous and its use has never become a well-established practice in business.

The covenant which finally was adopted for the building of the camps and cantonments is known as the emergency form of contract. In popular diction, it is called a cost-plus contract, but, strictly speaking, it is merely a modified form of the cost-plus idea. The advantages of this type of agreement are well recognized, and this arrangement for the performance of construction work has been steadily growing in favor. It is equally flexible for large and small projects and adjusts itself automatically to variations in plan involving either expansions or curtailments of the original estimates. It is little affected by unstable market conditions. Work to be performed under the cost-plus principle can begin immediately the contract is entered into, and the planning of the work may proceed simultaneously with the actual construction. The disadvantages urged against it are that this form of inden-

ture requires the utmost vigilance on the part of the owner and a painstaking and accurate check upon all construction costs. That it encourages extravagance on the part of the contractor and the existence of temptation to increase the cost, thus securing increased compensation, may also be raised as objections.

In the contract finally adopted, while the cost-plus principle governed, there were, however, a number of variations from the usual type. The possibilities presented were cost plus a fixed percentage; cost plus a flat amount; cost plus a sliding scale of percentages of profit, the percentage decreasing as the cost increases; or cost plus such a sliding scale with an upset price fixed, beyond which the contractor can receive no compensation, no matter what the cost of the job. The last named of these forms was the one actually adopted by the Construction Division with the advice of the Committee on Emergency Construction. As an illustration of its application, if the cost of the work were under $100,000, the contractor's fee would be 10 per cent; if over $100,000 and under $125,000, the fee would be 9 per cent; if over $125,000 and under $250,000, 8 per cent; if over $250,000 and under $266,666.67, the contractor would receive $20,000, and so on down. Should the cost be over $3,500,000, however, it was provided that the firm performing the work would be paid 6 per cent. A special provision was inserted into the contract that the total fee to the contractor should in no event exceed the sum of $250,000. These figures were inserted in the original contracts for the construction of the National Army cantonments where the cost had been estimated to amount to about $6,000,000 each. Based upon such figures, the contractors' fees would have been about 4 per cent of the total cost of each project. As a matter of fact, due to alterations, enlargements and changes in plans, the cost in every case reached sums considerably in excess of what had been anticipated. The $250,000 fee, however, remained the maximum possible. It will be observed that, based upon a foundation of percentages, the contractor, comparatively early in the building program, passed the point where all of the fee which could ever come to him had accrued. In other words, after this point had been passed, no matter whether or not the work cost a million dollars more, his fee was not increased by a single penny. Consequently, it was to his advantage, both for the sake of his reputation and in order to cut down his own overhead expenses, to finish up the job as speedily and economically as possible.

This principle has been followed with all the emergency construction work done by the Construction Division. The upset fee, of course, was proportionate to variations in amount of work done, but in all jobs of magnitude it has remained constant at $250,000, with the exception of one instance where, by special arrangement, it was made larger for an undertaking costing between $25,000,000 and $30,000,000. If, on the other hand, it were anticipated that the project would not cost more than a million dollars, the fixed sum, which could not be exceeded and was the maximum fee which the contractor could get, was made correspondingly smaller. The effort was constantly made to check any possible

tendency toward extravagance or prolonging the job, in order that the fee might be correspondingly enhanced. It is only just to the contractor to state that this tendency, the existence of which was quite widely asserted by uninformed critics of the War Department, never existed in fact. None the less, the insertion of the upset fee, judiciously calculated to correspond with the probable cost of the work, was a safeguard the moral effect of which is hard to overestimate. If any such tendency had existed, this provision would have effectually operated as a check, since it would have rendered such a course of action quite as undesirable from the contractor's standpoint as from that of the Government. It was in itself an effectual answer to the charges made by ill-advised and gratuitous critics of the War Department's management of construction work.

The drawing up of plans for the work was made by an engineering force which was early summoned to Washington. This staff consisted of architects, draftsmen, engineers and town planners, who evolved a set of typical plans, where were to be adapted by the construction men in the field to topographical conditions and the layout of the proposed military city. They formed merely a guide, and were subject to such changes as natural conditions might impose. With the exception of one or two instances, these controlling designs were invariably altered, although their underlying idea served as a model for the builders in the construction of all camps.

The selection of contractors was based on the recommendations of the Emergency Construction Committee after this agency had completed a careful survey of the contracting firms of the country and had digested all information furnished on invitation. The firms selected were those which from past experience and record of accomplishment were deemed most capable of conducting the work. As soon as the sites had been chosen and the Secretary of War had approved the selection of contractors, these firms were directed to get their forces upon the ground. As has been said, the representative of the Construction Division was the constructing quartermaster sent from the Washington office charged with entire responsibility for the work. His organization consisted of a number of commissioned assistants, a suitable clerical force and an auditing organization whose purpose was to check all expenditures by the contractor, to check all invoices of materials received, and to make a careful inspection of working time and payment to workmen.

In the meantime, a purchasing organization had been built up in Washington. Men, experienced in the purchasing of the various materials entering into the structures to be built, were recruited from the country's large construction organizations. In addition, the country was combed for lumber and pipe, nails and roofing paper and all of the innumerable items which go into construction work done upon a large scale. Materials began to roll into the camps almost as soon as notice of the selection of the sites was received. The building supplies were billed to the contractor on the ground, the invoices were checked and audited by the organization, payments were made and arrangements were perfected whereby the constructing quartermaster could

reimburse, usually within twenty-four hours, the contractor for his expenditures. The organization was not rigid but could be adapted to almost any sized undertaking. The Government was properly protected, and at the same time advantage was taken of civilian organizations which had been built up and brought to a high degree of excellence through years of experience and a long history of accomplishment.

It is a matter of record now that the camps were completed on time and that the mobilization of the conscripted army was not delayed by reason of failure of accommodations to receive the men as they were called out. This task was frankly considered impossible when it was originally delegated to Colonel Littell, and predictions were freely made that the camps could not be ready for the troops. That these predictions were false, and the fact that the camps were ready, was the result of intelligent planning and unceasing work one the part of the Washington organization, which was supported by the most devoted attention to "the job," coupled with good judgment and qualities of leadership on the part of the men in the field. Too high praise cannot be accorded to the constructing quartermasters, the Government's representatives in the field, who were directly responsible for the success or failure of the respective projects with which they were charged. They were men without training or experience in army methods. Their assignment to duty followed immediately upon receipt of their commissions, and they were literally thrust into the wilderness with a bundle of blueprints, a check book and a symbol number with instructions to have accommodations for 40,000 men and 15,000 animals ready in sixty days. The successful accomplishment of their tasks is a monument to the adaptability, ingenuity and dogged persistence of the American business men.

The nature of the cantonments is too well known to require description in this article. They were built of wood for two reasons: First, wood was available; and, second, wood was cheap. There was no other material which could have been procured in sufficient quantities or with sufficient dispatch to accomplish construction of such magnitude within the same time. The barracks were two-story and were designed to accommodate 200, 150 or 66 men. The 66-men type was finally adopted as the one best suited to the needs of the Army, four of them being used for a 250-men company. The question of water supply and storage was one which was studied with the utmost care, and to which the best energies of the division were devoted. That this problem was successfully solved in each case is attested by the fact that there has been no outbreak of disease attributable to a water supply. In fact, the appearance of water-borne diseases at the cantonments has been of such rare occurrence as to be negligible, and practically every case reported has been traced to a source unconnected with the camp water supply. It was impossible to secure sufficient iron pipe to meet the requirements of the water supplies of the camps and consequently wood stave pipe was used. This expedient, on the whole, gave very successful results.

In four of the cantonments, central steam heating plants were installed,

which have been operated fairly economically. The whole work of heating the camps and cantonments has cost about $10 per man. In the other camps, cannon stoves and room heaters were used. Although the winter of 1917-18 was one of unparalleled severity in every section of the country, there was no hardship suffered by the men on account of insufficient or inadequate heating facilities at any of the camps.

After the camps and cantonments had been completed, the same method of operation was adopted for the numerous other projects which the division was then called upon to undertake. These tasks increased in number progressively as the war went on, and construction work of every kind and character, for every department of the Army, was carried out by the Construction Division. It built warehouses and port storage facilities for the Director of Storage, hospitals for the Surgeon General, flying fields and warehouses for the Division of Military Aeronautics, proving grounds and industrial plants for the Ordnance Department and Chemical Warfare Service, special training camps, special repair shops for the Motor Transport Service, special training camps for the Quartermaster, Engineer, Ordnance and line troops.

On the day that the armistice was signed there were 535 construction operations going on at 442 different and widely separated locations. Work was in progress or had been completed in every state in the Union save one. The force of workmen employed in the field alone numbered more than 200,000 men; the number of officers engaged on construction work and operation of utilities was 1,487; the number of civilian employes of the Government similarly engaged was 12,355, of whom 10,000 were engaged on jobs and 2,355 employed in the administrative organization in Washington, which superintended, coordinated and administered the work. The maintenance and operation of finished projects, the care of public utilities, including the water supplies, sewerage systems, lights, etc., required a personnel of 16,559 enlisted men.

On many projects transportation and living facilities were utterly lacking and required the building of roads and railroads and the providing of living accommodations for the workmen before the actual construction could start. In other cases not only did this condition hold, but it was even necessary to clear out forest trees before these sites could be used.

The housing accommodations comprised 40 large camps and several hundred minor projects, providing accommodations for about 2,250,000 men. In connection with the large camps and the smaller projects as well, in addition to the actual housing, there were provided the necessary supplementary buildings and utilities. In the case of the major camps practically a complete city was built, including roads, electric lights, water supply, sewers, sleeping quarters, mess halls, lavatories, theaters, post-offices, store buildings, telephone and telegraph offices, power houses, laundries, storage buildings, hospitals, stables, garages and ice plants.

Even after construction is completed and the project put in use, the duties of the Construction Division are by no means finished. Indeed, the operating problem begins before the construction work ends, as the housing of troops commenced, for example, before the

camps were finished. Some agency must be set up for a wide range of tasks, such as keeping the streets and roads in repair, operating and maintaining the water and sewerage systems, electric light and power system, ice and refrigeration plants, heating plants, and making repairs and minor alterations to the thousands of buildings. These are the functions of the Operations and Maintenance Branch (officially known since September, 1918, as the Maintenance and Repair Division) of the Construction Division. This branch is charged with such duties at military posts, camps, cantonments, hospitals, terminals, depots and other establishments coming within the jurisdiction of the War Department.

During 1917 and the early part of 1918, when the Construction Division (or Cantonment Division, as it was then called) was a part of the office of the Quartermaster General, the field forces engaged in operation and maintenance were under the jurisdiction of the local camp quartermasters. These officers were naturally picked for the better known duties of quartermaster—subsistence, supply, transportation, pay, etc.—and their hands were fully occupied with such duties. Naturally their experience with operation and maintenance on army reservations was one the small-post peace-time basis, where the big-cantonment war-time problems never arose. Therefore, the first utilities officers placed in immediate charge of cantonment operation and maintenance labored under truly enormous handicaps. There were: (1) A deficiency of enlisted personnel, (2) a lack of local appreciation, higher up, of the number of men and the amounts of material demanded by the situation, (3) the slowness in the forming in Washington of a centralized operation and maintenance bureau to give adequate help to the local forces. The severe winter of 1917-18 still further added to the burdens of the field forces, and, in the northern cantonments, at least, the camps were kept running only by long hours of arduous duty on the part of officers and men. It is needless here to do more than mention the indefinite and apparently overlapping jurisdictions, during this period, of camp quartermaster, camp surgeon, sanitary corps representatives, in relation to the utilities officers who had to deal also with representatives from numerous offices in Washington.

It was not until the Cantonment Division emerged from under the wing of the Quartermaster General's office that proper development of the operating division was possible. Then the local utilities forces were dissociated from the local quartermasters and made directly responsible to the commanding general of the camp and to the division now called the Construction Division, which supervised the work and the funds required therefor.

It was in May, 1918, that utility operations received their first impetus toward adequate expansion. However, the Army Deficiency Bill of March, 1918, provided no funds for betterments, and the expansion program was correspondingly restricted. With the beginning of the new fiscal year, July 1, adequate authorization came for increased personnel and for needed funds. Especially in view of shortages of men and material, much credit is due those who sought to bring methods successful in similar civilian undertakings to the aid of the large army camps.

By the end of 1918 there were under

the jurisdiction of the Maintenance and Repair Division the roads, buildings and public utilities in 46 camps and cantonments, 51 hospitals, 66 border stations, 25 supply depots and terminals, and 271 regular military posts. For the fiscal year ending June 30, 1919, the funds for its use amount to $62,400,000.

It had as a field force, concerned with the actual operation of its functions at all of these points, 452 commissioned officers and 16,559 enlisted men. The Maintenance and Repair personnel in the Washington office consisted on that date of 20 commissioned officers and 126 civilians, of whom about 90 have been engaged in work for the entire Construction Division in the blueprinting and photostat rooms.

The organization of the Maintenance and Repair Division is similar to the general scheme of the Construction Division of the Army in that it follows, so far as practicable, the precedents indicated by civilian experience on a large scale. The division is composed of a series of seven branches or sections: (1) Personnel, (2) service, (3) statistics, (4) building repair, (5) fire protection, (6) light, heat, power and refrigeration, (7) water and sewers.

To keep in touch with these matters at so many posts and locations requires an efficient and complete central organization. At the same time, such a bureau should not be so highly organized as to impede its own work. The Washington office, in order to maintain intelligent supervision of these utilities scattered all over the United States, must be kept advised as to what is going on as well as to what are the actual needs. Utilities officers looked to Washington for prompt authorization of funds for repairs and extensions, for advice on matter of policy, and for information on countless points which arose.

There were two methods by which the central office acquired information. One was by reports of inspectors, and the other was through the study of the reports of the utilities officers themselves. A utilities officer is busy and has little time for the preparation of reports. Accordingly, only monthly statements, containing information in the most concise and brief forms, were required. These reports were usually headed by a summary outlining matter of particular importance, giving recommendations as to needs, etc.

When a report was received from a camp or other location, it did not follow the commonly supposed fate of such government documents, that of being filed away in archives without other than a hasty examination. It was carefully studied for two purposes: (1) To find out what had occurred during the previous month at the job, and (2) to analyze the proposition from the viewpoint of efficient and economical operation. The report was scrutinized by the chiefs of sections or branches, who attached memoranda with any comments or remarks. The officer in charge of the Maintenance and Repair Division then studied the questions of policy, conditions requiring correction were noted, and communications with instructions were prepared through aid of the memoranda attached by the section chiefs, and sent to the local or camp utilities officer.

At each completed project in charge of the operating force was stationed an officer, selected because of his achievements in civil life, who held a position

comparable to that of a "city manager," but with detailed responsibilities and duties far transcending those of such an official. Indeed, he was a composite of city manager, city engineer, fire marshal, street and building inspectors, manager of municipal water-works and sewers and telephone and electric-supply companies and cold storage.

The local organization was military in its character, and was worked out with a view to obtaining the greatest efficiency and the best results with a minimum of personnel and expense. A major was usually placed in charge of highly important work, and had as assistants a number of commissioned officers of lower grade. For operative and clerical assistants there was provided a detachment of enlisted men, varying in strength from 300 to 800 in various camps and cantonments.

Upon our entry into hostilities, the imagination of the average man grasped at once some conception of the extent of building necessary to house the hundreds of thousands of potential soldiers. Early in 1917, current periodicals were prolific in photographs of newly built barracks. Citizens visited the camps and came away with mental pictures of long rows of wooden structures in which the soldiers lived. This all led to the country at large having a fairly definite impression of the Construction Division's work in building cantonments and camps. The fact was never known or appreciated, however, that such work was dwarfed by the activities of the division in contructing shelter for auxiliary plants and services.

Such projects included army bases, interior posts, expeditionary depots, warehouses, terminal piers, wharves and docks, which were constructed along the most modern lines on a hitherto unparalleled scale. The areas total 27,502,300 square feet of warehouses and pier sheds, and 2,176,000 square feet of open sheds, giving a grand total of substantially 30,000,000 square feet, or 690 acres of storage space in the United States. A conception of the meaning of these figures is assisted by the realization that they would equal a building 70 feet wide and 80 miles long, or the distance from New York to Philadelphia. Most of the warehouses were of reinforced concrete. These figures do not include miscellaneous warehouses or magazines, or those at camps, or used exclusively by the Ordnance Department. Adjacent to the terminal piers and docks there are completed or well advanced at the present time, 39,000 linear feet of wharves (equivalent to 7.4 miles) for loading ships. This wharfage provides generally for channels with a depth of 35 feet at low tide, and is sufficient to berth 65 ships at one time on the basis of 600 feet in length of wharf per ship.

There have been built about 1,844 miles of railroads, exclusive of local trestles, etc., and about 1,061 miles of roads, of which a large percentage was of concrete.

The hospital section has built or reconstructed buildings to accommodate 121,000 patients, and in addition has provided quarters for about 12,000 nurses, 24,000 enlisted personnel, and 4,000 doctors. As in the case of camps, on many hospital projects it was necessary to install all utilities, such as sewers, water, gas, electricity, roads and railroads. To picture the extent of hospital construction, it may be said that, if all these army hospital capacities were consolidated, there would

result a population about equal to that of Worcester, Spokane or Memphis.

For the Ordnance Department alone there have been built more than 7,933,000 square feet (181 acres) of industrial and storage buidings, about 7,000 linear feet of docks, and about 3,250,000 square feet of magazines. The work for the Ordnance Department and the Chemical Warfare Service caused an expenditure of about $150,000,000 for proving grounds, ammunition depots, additional arsenal buildings, ammunition assembly plants, chemical manufacturing plants and gas arsenals.

The largest artillery proving ground at Aberdeen, Md., contains about 38,000 acres and has cost about $15,000,000. There were six (?) such proving grounds used to test all types of guns, from trench mortars to railway mounts and the 16-inch coast-defense guns, as well as for testing ammunition of all kinds, including the various types of gas shell. They are provided with steel and brick machine shops equipped with electrically driven machinery, including overhead cranes, etc., for assembling and repairing artillery.

The largest ammunition storage depot, at Raritan, N. J., contains over 90 fire-resisting magazines, has a storage capacity sufficient for nearly $400,000,000 worth of explosives, and cost about $12,000,000. Most of these depots, seven of which were constructed, are provided with extensive dock facilities and from 20 to 30 miles of railroad side track.

Various fire-resisting buildings of steel, brick, reinforced concrete and hollow tile, together with miscellaneous machinery, were built at nine of the permanent government arsenals, which are scattered from the Atlantic coast to California and Texas. There was no uniformity in the requirements of this permanent arsenal construction, but in several cases it amounted to a considerable sum of money. At Watervliet, for example, there was needed a steel and concrete machine shop about 250 feet by 600 feet in plan, and other buildings of like character, which added about 4,000 employes to the manufacturing force at that point.

Nine plants were built for assembling ammunition, etc., which included shell-loading plants for fixed ammunition, bag-filling plants for loose ammunition, two cartridge factories, one establishment for loading aerial bombs and one for manufacturing incendiary bullets. Several of these installations cover 3 or 4 square miles, with 300 to 500 separate buildings in one plant, and 30 to 40 miles of side tracks, besides power station, machinery, and equipment of all kinds. Much of this machinery, and to a large extent the operating buildings themselves, have had to be designed especially for their purpose.

Twenty chemical manufacturing plants, with their buildings, facilities, and equipment, for the manufacture of T. N. T., picric acid, tetryl, toluol, sulphuric acid, phosphorus, mustard gas, tear gas, sodium cyanide, and liquid nitrogen, were built. These plants cost from $1,000,000 to $13,000,000 each, and in most cases included housing facilities for the operating forces, as the plants were necessarily isolated.

The Edgewood Arsenal at Edgewood, Md., includes a plant for producing chlorine and other gases, many times larger than any other in the world, an extensive gas-shell filling plant, fire-resisting barracks, two hospitals, a 600-foot dam and reservoirs, and a 20,000-K. W. power station, costing in all about $25,000,000.

Various factories or factory additions were built for the manufacture of Liberty motors, tank tractors, automatic pistols, etc., as well as numerous laboratories and experimental stations.

The work of the Construction Division, summed up briefly, has covered such diversified projects as camps, cantonments, wharves, docks, forts, arsenals, great port terminals, reserve storage warehouses, hospitals of all sizes and descriptions, aviation fields, proving grounds, embarkation camps, engineer camps, gunnery schools, housing, lighters, power plants, factories, additions to manufacturing plants, munitions plants, and special new plants, for the production of nitrates, phosphorous, T. N. T., and miscellaneous acids, gases and explosives.

The limits of this article do not permit of a detailed discussion of the character of the work done, nor narration of incidents connected with its execution. While it has only been possible to touch upon salient features, enough has been told to show that it was necessary to consolidate all construction work under one head and to give the department to which it was entrusted the greatest possible latitude and freedom from interference or restraint on the part of other bureaus or departments. Although the Construction Division carried on building projects for every other staff corps in the Army, there was remarkably little friction between it and the agency for which it was conducting operations. In general the bureau involved drew up rough plans or indicated the nature and necessity for the kind of buildings which were desired. Detailed plans and estimates were drawn up in the office of the Construction Division and approved by the bureau in question. Authority for the expenditure of the funds involved was then requested from the Secretary of War, the contractor was selected and approved, and construction work started immediately.

Failure in the great task delegated to the Construction Division of the Army was freely predicted, but the seemingly impossible was effectually and economically accomplished. No greater tribute can be paid those whose ability, untiring energy and unselfish devotion were directly responsible for the successful performance of this colossal task, than to say that they were not found wanting in the supreme undertaking to which the nation had dedicated itself. The first draft troops were mobilized and went into buildings fully equipped with all modern sanitary devices, served with sewer and water connections, electrically lighted and guarded by a complete modern fire protection system, situated on land which sixty days before were forest or growing crops. Not only this, but there were in operation shops fully equipped with the necessary tools and an adequate personnel to care for maintenance and repair. The division has uniformly managed the multitude of military establishments built by them in a fashion calculated to inspire improvement in existing methods of doing work along more or less parallel lines in civil life.

The work of the Construction Division in magnitude, speed of accomplishment, number of men involved and workmen employed dwarfs any construction project the world has ever known. It is all the more wonderful and amazing when it is considered that, at the time of its accomplishment, executives and workmen who might ordi-

narily be used were diverted to the armies of the world, or to industries engaged in war work. The great efficiency of the division is, in a large measure, due to its having secured the services of so many highly experienced and successful men of affairs, whose advice has been freely sought and as freely given.

To have in the army organization a division, functioning in peace time for the purposes of construction and for operation and maintenance in a manner which at one and the same time insures high efficiency and reduces army expenditures, and which, in case of emergency, is capable of expanding in a minimum of time to a war footing, is a decided asset to the system of national defense.

Varied Ground

History Does Not Change

DOUGHBOY'S PART IN WINNING WAR

Who won the war?

"As an artilleryman I will not be adjudged partial when I say, 'The doughboy won the war,'" said Major Granville Fortescue, U. S. A., when he lectured on the Argonne Forest battle before members of the National Geographic Society yesterday afternoon and last evening.

"Marching into the jaws of death, regardless of machine guns and shell-fire, and defying barrages, the American doughboy, in that Argonne Forest battle, seemed to have no conception of fear," the speaker continued.—*Washington Post,* April 5, 1919.

The fraternal feeling between the Infantry and the Artillery has been strengthened by this war. Let it go on. The Artillery knows how the Infantry fights and the Infantry knows how the Artillery helps in preparing and finishing the job.

Good Form

In Great Britain officers who have been demobilized are receiving from the Army Council a letter bearing the signature of the Secretary, informing them that they are "disembodied," and adding, "I am also to take this opportunity of conveying the thanks of the Army Council for your services to the country during the late war, and for the excellent work you have done."

The English paper which quotes this says that it is a compliment from official quarters quite unexpected, and the more acceptable, therefore, on that account.

It is only a matter of form, but good form is worth emulating, and such a letter would, in the U. S. Army, mitigate the asperity of the statement that a man has been discharged for the convenience of the Government.

Propaganda

After all, earnest effort will produce results, and in this broad land of ours people are beginning to realize something of our obligations to the U. S. M. C. One earnest woman in the West has lately written to Washington urging that all the Marines who are still alive (there can be only a few of them) should be at once appointed officers. It is the very least that America can do for them, not as a reward—it would be impossible to give a commensurate one—but as a recognition of the fact that a great many people think that the Marines won the war and thereby saved France.

Lincoln it was who said: "You can fool all of the people some of the time, and some of the people all of the time, but not all of the people all of the time."

A Suggestion to Others

This is the way the 13th U. S. Infantry newspaper, *The Jolly Snorter,* helped the Infantry Association in the issue of April 23, 1919.

SUBSCRIBE FOR THE INFANTRY JOURNAL

Every infantry officer and every company library should subscribe for the INFANTRY JOURNAL, the only old infantry publication, and with an excellent reputation. The INFANTRY JOURNAL is one of the few military publications which survived the war, and although it has done this, it needs the support of subscribers more than ever. It is full of excellent data of all

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How to Put it Over

The phraseology of the advertisement which appeared in the *Morning Post,* inviting men to join the colors, is very different from that formerly adopted. A copy of an old recruiting poster issued in behalf of the 6th Regiment (now the 2d Battalion Welsh Regiment) announced that the regiment was commanded by General Cuyler, "an officer to whose distinguished merit no language can do justice." After setting out the advantages to be gained from joining the 69th Foot, the poster ends: "You will find me ready to receive you with a bottle of wine in one hand and sixteen guineas in the other, and before you join our regiment I intend to treat you with a supper and ball, when you may have the enthusiastic pleasure of dancing with the object of your affection." Another old recruiting poster of the Black Watch started off with the following prominent headlines:

"India Forever!
5 Shillings a Day, and a Black Servant.
God Prosper the 73d or Old Mangalore Regiment.

Brave, bold, and undaunted young Heroes of the Militia, remember your Pay in India. Five Shillings a day, and every man a Black Servant. Hasten to the Tower of London, where you will be welcomed and received into the ranks of the 73d, the flashing, flaming, fighting, Old Mangalores. God Save the King."—*The Living Age,* April 26, 1919.

It is thought that this recruiting campaign was successful in those days. History repeats itself, so perhaps a similar scheme may become necessary in the raising of a volunteer force in Great Britain *and other countries.*

Concerning Chevrons

The word *"chevron"* is derived from the French word "chèvre," meaning "goat," the reason being the fancied resemblance of the chevron to the angular arrangement of the horns of the goat. In some armies at the present time, and formerly in our own Army, the bars of the chevron were curved, thus making this resemblance more marked. This curving of the bars may still be seen in the chevrons worn by the cadets at the United States Military Academy, West Point, N. Y.

In heraldry the world "chevron" is used to denote a bent or angular bar on the field of the shield. As the chevron appears in heraldry, point up, it looks

like the gable of a house, placed in the field of the shield. The old De Cares family proudly displayed their simple shield with its three chevrons and nothing more on the field. The chevrons of the De Clares family were so well thought of that many families allied to them in marriage, the city of Cardiff, and also Clare College at Cambridge, still wear them on their coat of arms.

The army chevrons worn above the elbow, *i. e.*, those indicating rank, point up; those worn below the elbow, *i. e.*, those indicating wounds or war service, point down. In the Navy, however, just the reverse system in each case is followed.

In the Army the points of the chevron were worn up, from revolutionary days until 1851, when General Orders, No. 31, A. G. O., changed the regulation so that they were required to be pointed down, in which position they were worn until July 17, 1902, when General Orders No. 81, W. D., changed the regulations so as to require the chevrons to be pointed up, as in the earlier days.

It is believed that the reason for pointing the chevron up was not entirely due to the heraldic criterion, but also to the desire on the part of our ancestors to be harmonious in their artistic uniforms. Some of the chevrons were worn at that time below the elbow, and the gorge of the chevron surmounting the deep military cuff of those days was far more artistic in appearance than it would have been if the point of the chevron had surmounted the cuff.

The reversing of the points of the war service and wound chevrons is due probably to an artistic desire on the part of those in authority to give an even balance to the entire sleeve of our modern uniform.

It will therefore be seen that the Army chevrons of rank, *i. e.*, those worn above the elbow, follow the dictates of heraldry, and the Navy chevrons of rank do not; as the Army chevrons for war service and wounds do not follow the rules of heraldry and the same Navy chevrons do.

Editorial Department

Fanning the Flames

The fire of discord is burning in many places throughout the world today. Similar fires have been and are being kindled in many other places. Indeed the selfish sparks of personal ambition have been struck into the highly combustible tinder of unrest in some of these places not so far away from our own firesides and offices.

The Bosheviki and Maximalists are running rife in Russia and they claim that complete success can only attend their cause when the entire world has been converted to Bolshevism.

The propaganda spread by the Bolsheviki is not small in quantity nor harmless in its effect. In fact its insidious workings may be seen, as if from afar, in parts of our country today.

The Army must necessarily be dependable and proof against the spread of any principles which are contrary to the existence of sanity in living and government. It has always been so and will continue to be. Inaction, however, in an army is equivalent to acceptance of your opponent's plan. Moreover, it is equivalent to fanning the flames of his fire. When you hear remarks or notice things contrary to the lawful order of things and people, then stop them. Exert your influence against them. Don't be inactive and inert. Don't fan the flames!

Ⓓ

Manuals

Manuals are either directive or advisory. Directive manuals have the rigidity of an order, but advisory manuals permit the exercise of judgment. Accordingly, directive manuals must succeed advisory ones, for directive manuals are a decision, and a decision can only follow an estimate of the situation. An estimate of the situation is the result of a discussion.

It follows, therefore, that only such directive manuals as drill regulations should be issued by the Government. They are orders to be executed rigidly and literally. If the doctrine of war is to be a matter of War Department edict, there is the serious danger of reverting to the condition of the Prussian army prior to Jena, and, like that army, believe that the progress of the world had stopped some forty years before. It is easy to believe that the progress of the world has stopped, and the fact that it is comfortable to do so makes it all the easier.

If all publications covering military matters were issued by the Government and by the Government alone, if all other publications on military matters were on the *index expergatorius* as far as military men were concerned, it would undoubtedly be comfortable and pleasant, for there would be no change in them. It would also be a very convenient plan for any potential enemy who permits individual initiative and individual intelligence in the matter of military information. Censorship upon military information is right; censorship upon intelligence is wrong.

Any War Department resists change. Inertia is the essence of its life just as it is of all corporations. Nothing changes or improves from the inside. Change and improvement come only from external pressure. In the corpor-

ation, this change comes largely as a result of the demand for dividends and the necessity for earning them, and in War Departments from the impact of unpleasant individuals who want to know "why."

If no one in the military service can publish his work except under the seal of the A. G. O., there will be very few books written. The writing of a book requires a certain extra labor; you don't forget it when you go home; it is not easy work; an author wants his name on the title page and he wants any royalties that may be due him. Anonymity, under the seal of the A. G. O., is not sufficient endorsement or inducement to cause imagination to be put into proper production.

The methods of the Navy are worthy of consideration in this respect. The Naval Institute at Annapolis represents the Navy in the publication of manuals.

If the necessity arises for a new book on ballistics, or a "Blue Jackets' Handbook," or something of the kind, a competent officer is asked to write it. The Institute publishes it under the name of the writer, and both the Navy and individuals buy the number of copies needed. The royalty on sales goes to the writer and he has also the advantage of being publicly proclaimed to his fellows as a man who is recognized as speaking with authority upon the subject of his work, just as an eminent surgeon has his work on surgery put out to his professional associates.

This method of obtaining manuals is the only one which will give advisory books on doctrine. Committees can write drill regulations, but Caesar, Upton, Foch and Von der Goltz are not the names of committees.

If we put a damper on individual writing, we curtail reading and exchange of thought; in other words, we lower our professional zeal and therefore our professional accomplishments.

Ⓓ

Training Areas

No matter what the military establishment may be, it is essential that organizations and troops must be trained in selected areas. The old garrison or post system of training should not be considered; the experiences of the war have fully proven this. The selected areas must be in the nature of training centers and technical centers. The training center should comprise camps, cantonments, firing areas, maneuver areas and school areas. The technical center should comprise technical and special postgraduate school areas. In addition, there must be combined maneuver areas which should be of sufficient size to enable large bodies of troops of different arms to operate in combined maneuvers and with service firing.

These training and technical centers are necessary to enable the troops to function properly and at the same time to enable the officers and men to maneuver and drill in an atmosphere of their arm of the service. In addition, a means is offered whereby the necessary *esprit de corps* of the arm may be developed and increased.

The location of these training and technical centers is most important. They must be located in districts which will afford open weather throughout the year, thus giving the greatest possible number of days of outdoor work. Since the day of each arm operating independently is over, and since, to operate successfully, the different arms of the service must have a knowledge of

each other and must be trained in combined maneuvers, the training areas of the different arms must be situated in close proximity. In addition, to secure the best result in this connection, the officers of one arm must be trained at various times with organizations of other arms.

As the cost of travel for movement of troops to maneuver areas must be considered, the training centers must be placed in close proximity. In order to fit any possible military system, the training areas should be apportioned to the various sections of the United States, keeping in mind the population and the climatic conditions.

In order to insure proper coordination and results, the training centers and technical centers, as regards training, instruction, education and tactical inspections, must be under the general supervision of the Training and Instruction Branch, General Staff.

These are the general conditions which must be met, but it is not going to be easy to work out the detailed plans, without which any general statement will not carry us very far. We shall find that it is easier to establish a training camp than it is to abolish one, for training camps at once create local interests because they bring money. There is no community in the world which is not glad to have money spent in it, and there is no really live community which will not fight to have the continuance of that spending secured.

Φ

Uniforms

Now that the U. S. Army of the War of 1917 is being demobilized and is not only wearing the uniform home, but is going to wear that uniform or parts of it until worn out, it is worth considering whether the time is not approaching when we should follow the precedent set by the Navy and consider changes in the uniform.

After all, a uniform is a distinctive dress which marks its wearers as performing certain duties; whether it is the uniform of a major general or of an elevator boy, it means that its wearer has certain functions. It accordingly prevents the asking of useless questions and indicates the exact identity and calling of the wearer.

Under the present conditions of uniform and insignia these questions will be asked, and the red chevron is a sufficient response to them.

It is with a very natural pride that men who have been discharged from the service should continue to wear the uniforms to which their service brought honor and credit, but upon them it is no longer the uniform of the United States. It is essentially a decoration to be worn at the wearer's will. He is not required to wear it, and the wearing of it carries no obligations. It does not mean that he is charged with certain functions, for those have ceased with his separation from the service. It is quite true that there is legislation permitting the wearing of the uniform by men who have been discharged from the service, and it is going to be extremely difficult to limit such legislation. The time will come, is coming, when the uniform of discharged men will become simply clothes to be worn in such combinations as seem expedient or merely desirable to the owner.

The solution would seem to be to change the uniform of the U. S. Army and have that change go into effect with the new army organization, whatever and whenever that may be.

This at once brings up the question

of cost, not only to the Government, but to individuals in the service. There are reserve stocks of uniforms and insignia in the hands of the Government and the individual; consequently any change must take this fact into account. This question of cost to the Government could be reduced to the minimum by using the existing reserve stocks, gradually replacing with the new type. The additional cost to the individual can be lessened and perhaps made negligible by giving sufficient notice in advance of the adoption of the new type. The fact that any civilian tailor can make the suggested type will give healthy competition with a consequential price lowering in the uniform business, and in a short time the additional cost to the individual will reverse itself and become a positive saving.

It is possible that an open collar of the British uniform type would make the necessary distinction, especially if the marks of rank were indicated on the collar or on the sleeve in the naval manner, but not in gold.

Probably the most serious question is the color of the uniform. A good many different shades of browns have appeared in the uniforms. Breeches and blouses by no means necessarily match as they should according to our regulations. Indeed, according to the principles of protective coloration, they should not match, and it would be quite possible to recognize this as a basis for the distinction between the uniform of 1917 and that of, say, 1920.

In short, if all blouses were a greenish-brown or some other color which could be obtained by dyeing the present stock, the necessary distinction would be made, and, by choosing the proper shade, the principles of protective coloration would not be violated.

A few individuals are opposed to any change in the uniform; in fact, these same people are usually opposed to any change in anything. This is unprogressive. The new Army must be progressive. Let the War Department hear from you officially on this subject. A straw vote at your post might give a valuable criterion on this subject.

Book Reviews

Koehler's West Point Manual of Disciplinary Physical Training, by Lieutenant Colonel H. J. Koehler, U. S. A. Foreword by Hon. Newton D. Baker, Secretary of War. New York: E. P. Dutton Company, 1919. 12mo, cloth, illustrated, 194 pages.

Colonel Koehler's "Manual of Disciplinary Physical Training," with a foreword by the Secretary of War, in general is a revision of Special Regulations No. 23, War Department, 1917, but the new manual is profusely illustrated and many new chapters are added. The value of physical training for disciplinary and educational purposes is emphasized. The chapter on mass commands and the treatment of the general subject of the training of an officer to give commands correctly is of special value. The book is interesting and is easy to read; furthermore, it contains suggestions which, if followed, will make physical training a pleasure to the instructor and a recreation for the men. Colonel Koehler's experience and marvelous successes in such work are too well known to require mention here, and the fact that he has written an improved and revised manual is all the notice the service needs.

Principles of Radiotelegraphy, by Cyril M. Jansky, B.S., B.A. New York: McGraw-Hill Book Company, Inc., 1919. Cloth, 8vo, 242 pages, illustrated. Price, $2.00.

The author's presentation of the fundamental principles of radiotelegraphy, and particularly his discussion of alternating currents and high frequency circuits and currents, should prove of considerable value to a practical wireless man who is not able to take advantage of a theoretical college course. The character of the explanations and the introduction of numerous examples illustrating the use of the formulae are particularly commendable. This book could well be used in the average physics course in a college to great advantage, although for university work, where the principles of radiotelegraphy and radiotelephony are taught at greater length, the book would be found to be too elementary in character.

The chapters on Practicable Receiving Appliances and Methods, while sound in theory, unfortunately describe types of apparatus more or less amateur in character or already obsolete, in view of recent developments in radiotelegraphy and telephony during the war just terminated.

It is believed that too small an amount of space has been reserved for a description of vacuum tubes and their use. In view of the remarkable development of this tube and its use, not only for radiotelegraphy and telephony, but for multiplex wired wireless telegraphy and telephony, its use as a repeater for wire telephony, and in consideration of the interest now being stimulated by all government departments in the further development of this tube because of the possibility of its use in large sizes as a transmitting source of considerable power for radio work, it is believed that the book might have been materially strengthened by the addition of information on this subject which is already available in scientific publications and is undoubtedly well known to

the author. As the book appears to have been written with the needs of the amateur radio operator in view, it appears that he might have been given a description of other methods than those described, particularly as it is believed that within a year practically all amateur operators in the United States will have discarded their old spark-transmitting apparatus in favor of a vacuum tube transmitter of considerably lower power, due particularly to the fact that so many of these operators were in the service and gained a knowledge of the possibilities of this type of set through contact with the Signal Corps apparatus used in France.

Even if exception has been taken to the character of the apparatus illustrated and described in the book, nevertheless the way in which the theoretical principles of the art are described warrants us in recommending that the book would be of value as part of a library in places where men in the service are undergoing instruction in radiotelegraphy, while for the real serious amateur radio man who is preparing for examination for a commercial license, and who is not in a position to receive theoretical instruction but must depend upon his own reading for a knowledge of this art, this book should prove of inestimable value.

Mess Management, by Lieut. Colonel William E. Dunn, 344th Field Artillery, Philadelphia: J. B. Lippincott Company, 1919. Flexible cloth, 16mo. Price, $1.00 net.

"The secret of running a good mess is to put plenty of work on it, and the kind of work that counts is headwork." But the secret of making headwork count is having a definite idea of what is to be done and how it can be accomplished. The inexperienced officer who is given responsibility for the mess will find some of the aid that he needs in this practical manual.

It is a small volume which can be carried in the pocket, ready for consultation whenever needed. For mess officers, it is a guide on how to organize and how to supervise the operation of the mess, so as to insure the men being well fed on the government money allowance for food.

For mess sergeants, the manual contains detailed directions on how to keep mess accounts, how to plan menus, and how to plan purchases. A special feature is the listing of sample menus prepared by experienced mess sergeants. This will prove particularly helpful to newly appointed mess sergeants and will undoubtedly be valued also by men of longer experience as an aid to quicken work.

Recruit Manual, by George C. Thorpe, Colonel, U. S. M. C. Philadelphia: J. B. Lippincott Company, Cloth, 16mo, 168 pages. Price, $1.00 net.

This little book, prepared by direction of the Brigade Commander, Second Provisional Brigade, U. S. Marine Corps, and authorized for publication by the Secretary of the Navy is full of practical advice and suggestions for the young recruit. A mere reading of it will help the embryo soldier to more quickly pass out of his recruit period into the private soldier period. Attention is given to essentials, and thus the larger ideas are the sooner instilled.

A collection of definitions of terms usually confused by the recruit adds to the value of the book.

The American Air Service, by Arthur Sweetser, Some time Captain, Air Service, United States Army. With an Introduction by Newton D. Baker, Secretary of War. New York: D. Appleton & Co., 1919. Cloth, 384 pages, illustrated. Price, $2.50.

Here is told the story of American military aviation. The book covers many phases of our war program and contains many facts new to the public, including hitherto unpublished figures, cablegrams and other data. Beginning with the early experiments of Langley, Captain Sweetser traces briefly the development of aviation in America up to the entry of the United States into the war. He then shows how the Air Service was first projected as an arm of the military establishment proportioned to the other arms and how, in response to requests from the Allies, the program was later expanded into an attempt to create an immense independent striking force, which should not only give the supremacy of the air to the Allies but should also constitute great contribution to their actual military strength. Captain Sweetser then takes up the separate problems of the training of the fliers, the training of the great ground forces, the production of engines, culminating in the development of the Liberty motor and the development of plane construction, first bringing the story down to the disruption of the Air Service and the new start after the storm of May, 1918. At this point he examines the real meaning of the program upon which the United States had embarked and shows its essential impossibilities. Captain Sweetser then brings the whole story down to the signing of the armistice, not only in training and aircraft production at home but in the actual work of the Air Service overseas. The interesting concluding chapters deal with the work of the fliers in the United States, including the establishment of the Air Mail Service, the organization of the Air Service in France, and the achievements of the American aviators and balloon men at the front.

THE UNITED STATES INFANTRY ASSOCIATION

"The object of the Association shall be to promote the efficiency of the Infantry arm of the military service of our country by maintaining its best standards and traditions, by fostering esprit de corps, by the dissemination of professional knowledge, and by exchange of ideas as to the utilization of such knowledge with particular reference to the rôle of Infantry in modern war."—Article III of the Constitution.

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1000

Do It Now

Now that the 5th Liberty Loan—the Victory Loan—has gone "over the top," the Salvation Army's drive is well taken care of and the Methodists have accomplished their ideals in raising their quota, can't the stalwart infantrymen of the Army, that turned the balance in Europe, devote fifteen minutes of one day this month toward helping the Association? Fifteen minutes are more than enough—five minutes are usually sufficient to get one new subscriber or member or the renewal of the subscription of an old friend.

If each one of our steady members will do this one little thing he will have done "his bit" and the Infantry Association will have doubled its membership within the ensuing month. The idea is to increase the influence of our Association and its JOURNAL at this period of our existence. This can only be done by increasing our subscription list.

Let each of us pledge himself to *send in the name of one member* or subscriber at once, and at the same time see that his own address on the books of the JOURNAL is correct.

All infantrymen should subscribe and all others ought to do so. The company libraries and reading rooms certainly should be on our books. Prominent and patriotic civilians need the INFANTRY JOURNAL. We need them.

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No. 54

WASHINGTON, D. C.
JUNE 1, 1919

1. Some of our readers have called attention to the fact that while our remarks on this page in the May issue were supposedly addressed to them, they were in reality an appeal to advertisers.

2. This assumption brings out more forcibly than anything we ourselves might say, the cooperation that exists between our readers and our advertisers.

3. When a writer is charged by partisans of each side to a controversy of favoring the other side, he can flatter himself that he has at least been neutral.

4. Not that we want to be neutral! We like to take sides. We like to have convictions and express them.

5. The interests of readers and advertisers in the INFANTRY JOURNAL are, however, so nearly alike that there is little to choose between them.

6. We, therefore, adopt the commonsense course and advocate cooperation. In union there is strength!

7. The INFANTRY JOURNAL is strong! Our advertisers are strong! Therefore, if we join hands, we will be doubly strong—if not irresistible.

8. Remember that our slogan is cooperation. It is the Infantry Way! It is the Only Way.

Index to Advertisers

	Page
Acme Motor Parts Corp	21b
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Allison & Co	11b
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Champion Ignition Co	16b
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Harley-Davidson Motor Company	10b
Henderson & Co., F. R	9b
Hinkley Motors Corp	30b
Hoffman & Billings Mfg. Co	24b
Hoffman Specialty Co	32b
Home Insurance Co	26b
Hoppe, Frank A	22b
Hudson Sheet & Tin Plate Co	20b
Johnston, R. A	14b
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Naylor & Company	18b
Newton Machine Tool Works	11b
Nielson & Danielsen	21b
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Peerless Motor Car Co	27b
Poel & Kelly	9b
Polk Company, J. T	14b
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Post van der Burg Company	5b
Pratt & Whitney Practice	4b
Racine Malleable & Wrought Iron Co	18b
Ralston Steel Car Co	21b
Riggs National Bank	Cover
Rivoire, Henry J	20b
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Three-in-One Oil Company	29b
Trans-Oceanic Chartering Corp	8b
Trans-Oceanic Trading Co	8b
Turner Construction Co	19b

Index to Advertisers—Continued

	Page
Underwood Typewriter Co.	9b
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Union Trust Company	30b
Van Dorn Iron Works	12b
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CONTENTS

INDIVIDUAL INSTRUCTION IN RIFLE PRACTICE....Col. A. J. Macnab, Jr., U. S. Army.... 921

THE BATTLE OF 1918....Gen. M. E. Debeney, 1st French Army.. 945

THE TOP-SERGEANT....Maj. Thomas Swann, Reserve Corps.... 948

ORDER AND DISCIPLINE....Carlos Bell.... 953

FLANK MOVEMENTS OF THE PRESENT....1st Lieut. E. Colby, 33d Infantry.... 960

EMPLOYMENT OF FIELD ARTILLERY WITH INFANTRY....Col. E. L. Gruber, Field Artillery.... 967

WAR-TIME CONSTRUCTION....Col. Chas. D. Hartman, Q. M. Corps.... 974

VARIED GROUND:

History Does not Change.... 990
Good Form.... 990
Propaganda.... 990
A Suggestion to Others.... 990
How to Put It Over.... 991
Concerning Chevrons.... 991

EDITORIAL DEPARTMENT:

Panning the Flames.... 993
Manuals.... 993
Training Areas.... 994
Uniforms.... 995

BOOK REVIEWS.... 997

Koehler's West Point Manual of Disciplinary Physical Training—Principles of Radiotelegraphy—Mess Management—Recruit Manual—The American Air Service.

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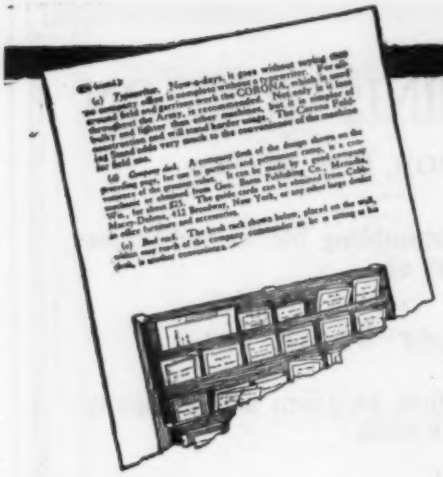

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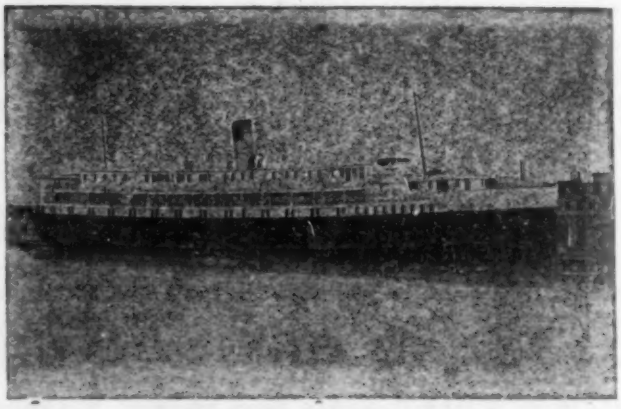

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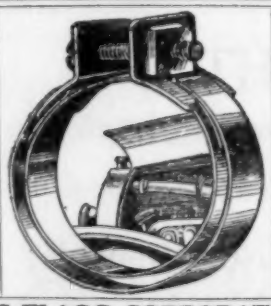

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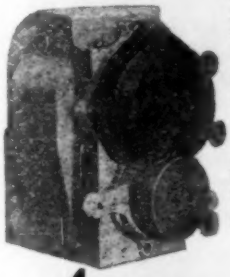

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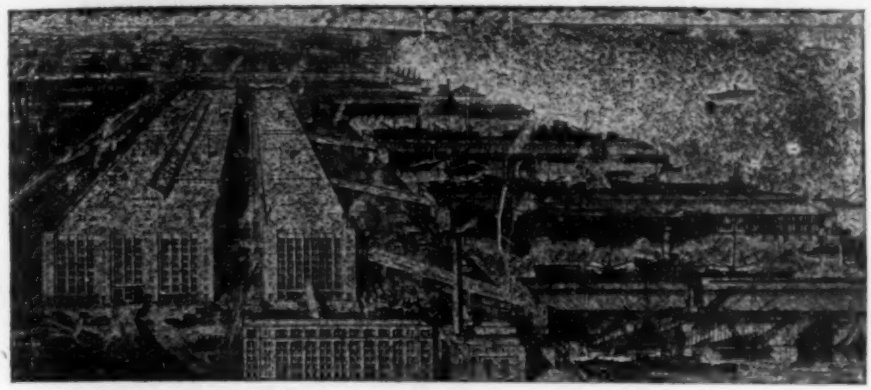

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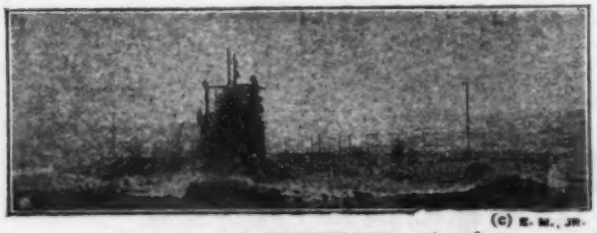

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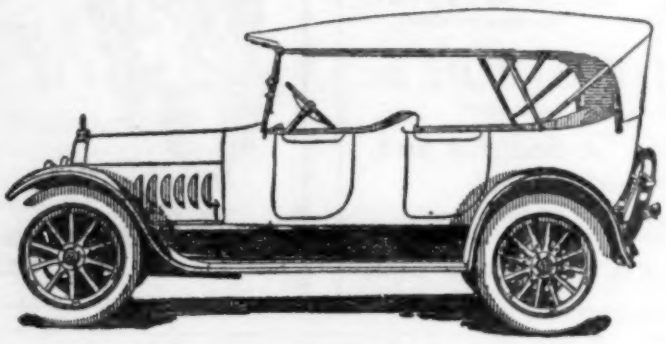

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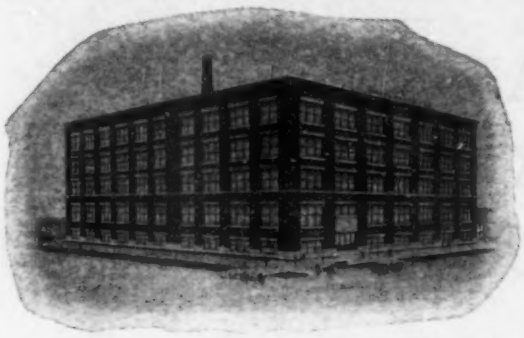

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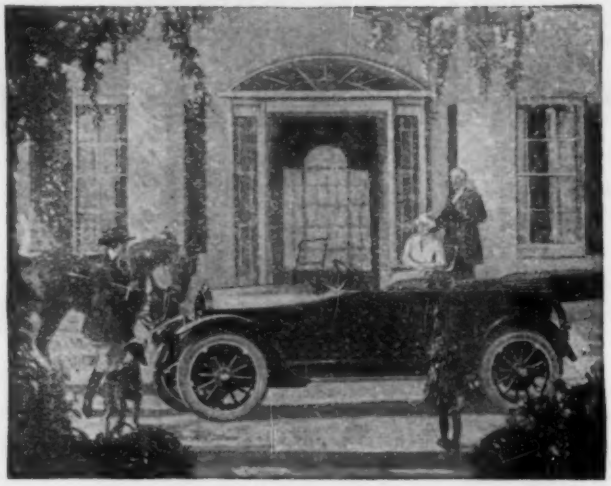

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Does not give one time to use this array of equipment even were it practicable to supply it and transport it.

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